Contents

SPECIFICATIONS
CONDENSED OPERATING INSTRUCTIONS
INTRODUCTION – SECTION 1
INSTALLATION – SECTION 2
OPERATION – SECTION 3
THEORY – SECTION 4
SERVICE AND MAINTENANCE – SECTION 5
PARTS LISTS AND DIAGRAMS – SECTION 6

WARRANTY

We warrant that each new instrument manufactured and sold by us is free from defects in material and workmanship and that, properly used, it will perform in full accordance with applicable specifications for a period of two years after original shipment. Any instrument or component that is found within the two-year period not to meet these standards after examination by our factory, District Office, or authorized repair agency personnel will be repaired or, at our option, replaced without charge, except for tubes or batteries that have given normal service.

Type 1926 Multichannel RMS Detector

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West Concord, Massachusetts, U.S.A. 01781
Form 1926-0100-B
January, 1970
ID 0100

Condensed Operating Instructions

CALIBRATION WITH KNOWN SIGNAL.

a. Apply a calibration signal of known level and frequency to AJ6 CHANNEL INPUTS connector (and AJ5, for 45-channel version; refer to Table 1-5).

b. Turn on line POWER (front-panel switch).

c. Set LOWEST BAND NUMBER and HIGHEST BAND NUMBER controls on 1926 to band that contains frequency of calibration signal.

d. Set 1926 controls to 1 SECOND INTEGRATION TIME, MULTIPLE MODE, XY PLOT. Push START and PANEL DISPLAY buttons.

e. Observe BAND LEVEL dB Nixie-tube indicators. (Slow down display by adjusting DISPLAY RATE control, if necessary).

f. Adjust MAXIMUM BAND LEVEL dB thumbwheels until display reads correct level for that calibration signal. All subsequent data will now read directly in the appropriate decibel values for the reference of the calibration signal (e.g., 0.0002 μbar, 1 $\mu N/m^2$, etc.).

NOTE

An "8" or "9" in the most-significant digit of the display indicates an overload condition. Reduce the calibration signal to a lower known level and readjust the MAXIMUM BAND LEVEL dB controls on the 1926 to restore the appropriate reference-level reading.

If the calibration signal is varying too rapidly to obtain a reference setting, choose a longer INTEGRATION TIME.

If no calibration signal is available, try to obtain on-scale readings from data to be analyzed, either by finding the maximum level anticipated (and making this "full scale") or by making lowest level appear at lowest part of scale.

CALIBRATION OF OUTPUT-DISPLAY DEVICES.

After performing the above procedure:

a. Remove signal from input.

b. Set LOWEST BAND NUMBER control to the ***second*** band ***below*** lowest standard band number on the particular version of the 1926. Set HIGHEST BAND NUMBER control to next band above LOWEST BAND NUMBER setting. The lower band is the "full scale" reference. It corresponds to the setting of the MAXIMUM BAND LEVEL dB control, and covers the 60-dB display range. The higher band is the "zero" reference for the output display.

c. The resulting signals at the analog and digital outputs can then be used to set full-scale and zero (60 dB below full scale) points on X-Y plotters, oscilloscopes, digital printers, etc. (The bands can be selected one at a time, if desired.)

MEASUREMENT PROCEDURE.

a. Connect the unknown signal to AJ6 (and AJ5, for 45-channel version; refer to Table 1-5).

b. Switch POWER ON.

c. Set LOWEST BAND NUMBER and HIGHEST BAND NUMBER controls to display frequency range of interest.

NOTE

The 1926 will always measure and store the entire spectrum, regardless of these settings; therefore, the settings can be changed at any time, or expanded after the measurement, if the mode is SINGLE-HOLD.

d. An "8" or "9" in the most-significant digit of the display indicates an overload condition. Repeat the above calibration procedure at a level that will give a dynamic range covering the anticipated range of the unknown signals.

e. Set the front-panel controls to select:

1. INTEGRATION TIME (select one of the nine buttons).
2. MEASUREMENT MODE (refer to Table 1-4 for details).
   (a) SINGLE for one measurement and one output cycle.
   (b) SINGLE-HOLD for one measurement and ***repeated*** output cycles.

(c) MULTIPLE for repeated measure/output cycles.

3. OUTPUT DISPLAY Devices. Select the appropriate OUTPUT DISPLAY button for the output device used. If more than one display device is used, the output rate should be set to accommodate the slowest device.

4. REMOTE AND MANUAL Controls. Refer to paragraph 3-4 for information on use of REMOTE and MANUAL positions.

f. Push START button. Measurement and display sequence(s) will automatically cycle per the preset condition above. In MULTIPLE and SINGLE-HOLD modes, cycling will continue until the STOP, START, or PAUSE button is pushed.

g. Note the BAND LEVEL indication on the 1926 and on the output-display device.

USE OF PAUSE BUTTON

The PAUSE control should be used ***only to halt the output cycle.*** When the 1926 is measuring the input signal, the INTEGRATING indicator is illuminated. When the 1926 is ***displaying*** information obtained during the measurement, the INTEGRATING indicator is darkened, and only the pilot spot above it is illuminated. The PAUSE button, when depressed, halts the 1926 (to allow output devices to be adjusted, etc.) and latches in that position. When it is pushed again, it releases, and the display resumes at the point in its cycle at which the PAUSE button was pushed.

Use of the STOP button results in the need to push the START button to resume operation. This, then, destroys the previously measured data and makes an entirely new measurement.

DETECTOR OVERLOAD.

If the measured signal level has exceeded the capacity of the 1926 Multichannel RMS Detector in any of its bands, that band-level (or levels) is displayed as follows:

1. Digital indicators and digital data read "8" or "9" in the most significant digit (i.e., 8XX.XX or 9XX.XX).

2. Analog data are made to jitter quite noticeably (i.e., scope trace brightens, X-Y plot jitters).

All other band-level data are still valid, but the overloaded-channel bandlevels should be disregarded.

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Specifications

Input: *Channels,* 30 or 45. *Sensitivity,* 1 V full scale ±10%, 1 mV to 1 V rms range of ac component, 0.1 V max dc component, 3 V max peak ac component for linear operation. *Input impedance,* ≈ 5kΩ; 0 to 30-Ω allowable source impedance.

Analog Output: *Level* (Y axis), linear in dB, 0 to +1 V ±10% corresponds to 0 to 60 dB; overload indicated by jitter superimposed on level. *Channel number* (X axis), linear, adjustable to 1 V corresponding to a quantity of output channels ranging from 10 to 45.

Digital Output: *Level,* 0 to 159 dB in 0.25-dB steps represented by 5 BCD digits; overload indicated by 8 or 9 as the hundreds digit. *Channel number,* 2 BCD digits. *Logic levels,* standard 5-V TTL (15-V DTL available on special request), positive true. *Output period,* advance from one channel to the next is automatic at 720 μs to 1 s for 45 channels or manual by pushbutton or external command.

Dynamic Range: 70 dB; 60 dB is displayed, 10 dB at full scale is crest-factor margin, increasing below full scale. Repeatability for tone burst with 1/100 duty factor (equivalent to crest factor of ≈ 23 dB) is better than 1 dB (1 δ limit) when rms levels are lower than 13 dB below full scale.

Sampling: 1024 samples taken for integration periods of 1 to 32 s, reduced in proportion to integration period for periods <1 s to a minimum of 128; time between samples depends on integration period; rate is swept over a range of 1.8 to 1 during integration period to reduce coherence effects.

Detection: Rms with true (linear) integration. *Integration periods,* nine, ⅛, ¼, ½, 1, 2, 4, 8, 16, 32 s. *Linearity,* ±0.5-dB deviation from best straight-line fit over top 50-dB display range for any channel, ±1 dB over entire 60-dB range. *Memory duration,* unlimited while power is on.

Frequency: Lower 3-dB point is <1 Hz for channels 1 to 10, <6 Hz for all others; error in frequency response is <1 dB at 100 kHz.

Display: 5 neon read-out tubes for band level in dB, 2 for channel number (or Standard Band Number if desired).

Calibration: Full-scale and zero self-level calibration provided in 2 auxiliary channels; front-panel controls allow a calibration factor to be added to digital output. Indicated level range is adjustable in 1-dB steps from 60 to 159 dB.

Programmability: All panel-control functions except output display time are programmable by standard DTL or TTL logic elements or closures to ground.

Power: 100 to 125 or 200 to 250 V, 50-60 Hz, 135 W.

Mechanical: Rack model only. *Dimensions* (w x h x d): 19 x 8¾ x 17⅞ in. (485 x 225 x 444 mm). *Weight:* 46½ lb (102 kg) net, 55 lb (25 kg) shipping.

Introduction—Section 1

1.1 PURPOSE 1-1
1.2 DESCRIPTION 1-1
1.3 ACCESSORIES SUPPLIED 1-2
1.4 CONTROLS, INDICATORS AND CONNECTORS 1-2
1.5 ACCESSORY INSTRUMENTS 1-5
1.6 PATCH CORDS 1-9

1.1 PURPOSE.

The 1926 Multichannel RMS Detector computes the true rms level for each separate input channel. The digital detection scheme employed offers a wide dynamic range while maintaining an accurate rms characteristic. Answers are obtained at a much faster rate than is possible with the running-average circuits found in analog devices. Both digital (1-2-4-8 code) and analog outputs are produced.

1.2 DESCRIPTION.

The 1926 Multichannel RMS Detector can be considered to be a 45-channel voltmeter with near-ideal characteristics. It can be used to measure as many as 45 signals simultaneously. The signals can be derived from multiple transducers or other sources. The Detector samples each input-channel signal and feeds these samples to the digital circuits that are time shared on all channels.

The Detector simultaneously computes the rms level for each channel. Up to 1024 samples are taken from each channel; the samples are converted to a digital binary number and squared. The squared values are accumulated in a memory register, where spaces are provided for all channels.

Single integration or measurement periods are adjustable in nine octave steps ranging from 1/8 to 32 seconds. For integration periods of 1 and longer, 1024 samples are taken from each channel during the integration period. For shorter integration periods the number of samples is proportionately reduced, with a minimum of 128 samples being taken in a 1/8 integration period. At the end of an integration period, the sum-of-squares value is converted to decibels for output presentation. A single answer can be fed to a high-speed receiving device in about 15 μs, and all channel levels can be presented at the output in less than 1 ms.

Output data are presented simultaneously in digital (BCD format) and analog forms, and on a front-panel visual numeric display. Control signals and format permit output interfaces with a digital computer, printer, oscilloscope, automatic dc step-chart recorder, or XY plotter. A panel control allows the operator to add a scale factor to the digital output. The detector requires an input signal level of 1 V, rms, for full-scale maximum output. The output indication corresponding to a 1 V input signal is adjustable from 60 to 159 dB in 1-dB steps.

Band numbers are presented with each output level and are set to correspond to the USA Standard Band Numbers for 1/3-octave filters (ANS S1.6 - 1967). The number of channels to be displayed is controlled by the LOWEST BAND NUMBER and HIGHEST BAND NUMBER control settings.

Two extra internal channels are included, to calibrate zero level and full scale on the 1926. They can be measured during each integration period to monitor calibration continuously, if desired. The calibration channels are also

intended to be used to set up analog output equipment, such as a reader or oscilloscope.

The 1926 Multichannel RMS Detector is available in 30- or 45-channel models, either bench or rack mounted. The GR catalog numbers are given in Table 1-1.

1.3 ACCESSORIES SUPPLIED.

The accessories supplied with the 1926 Multichannel RMS Detector are listed in Table 1-2.

1.4 CONTROLS, INDICATORS AND CONNECTORS.

The controls, indicators and connectors on the front and rear panels of the Detector are listed in Tables 1-3, 1-4 and 1-5.

Table 1-1
BASIC VERSIONS OF THE DETECTOR

Number of Channels	Mounting	GR Catalog Number
30	Bench	1926-9700
30	Rack	1926-9701
45	Bench	1926-9702
45	Rack	1926-9703

Table 1-2
ACCESSORIES SUPPLIED

No. Supplied	Description	GR Catalog Number
1	Power cable, 3-terminal, 7 ft. long, to connect system to line power.	4200-9622
2	Connectors, 24 contacts, male (Amphenol 57-30240).	4220-3024
3	Connectors, 36 contacts, male (Amphenol 57-30360).	4220-3036
2	Connectors, 50 contacts, male (Amphenol 57-30500).	4220-3050

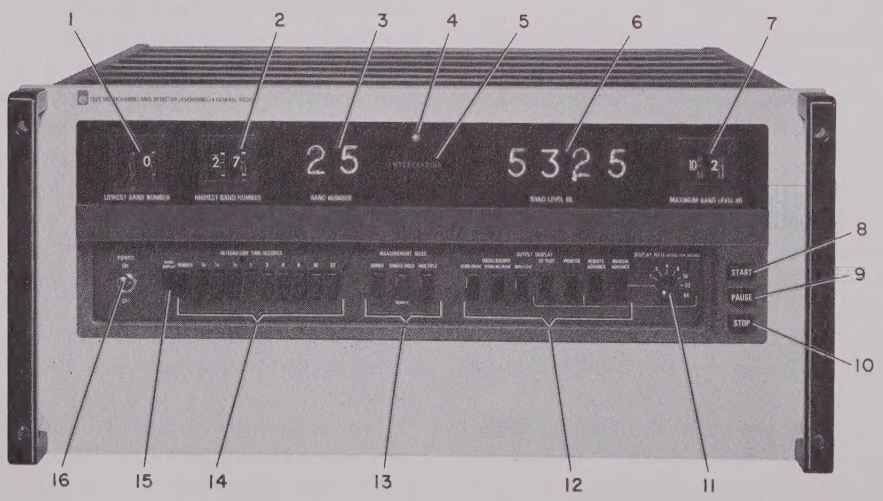


Figure 1-1. Front-panel view of the Detector showing controls and indicators.

Table 1-3

FRONT-PANEL CONTROLS AND INDICATORS ON THE 1926 RMS DETECTOR

Fig. 1-1 Ref.	Name	Type	Function
1	LOWEST BAND	Thumbwheel switches (2)	Select the number of the first band to be displayed during the output mode. Normally set to values between 0 and 49, but is sometimes set to 62 or 63 for self check.
2	HIGHEST BAND NUMBER	Thumbwheel switches (2)	Select the number of the last band to be displayed during the output mode. Adjustable from 0 to 49.
3	BAND NUMBER	Nixie tubes	Indicates the number of the standard band being displayed.
4	Pilot Light	Illuminated spot	Indicates when the instrument is energized (line power is on).
5	INTEGRATING	Illuminated sign	Indicates that the instrument is in the measuring mode.
6	BAND LEVEL dB	Nixie tubes	Indicates the level, in dB, of the standard band being displayed.
7	MAXIMUM BAND LEVEL dB	Thumbwheel switches (2)	Select the level, in dB, that will be displayed for a 1-V, rms, input (to 1926) signal. Can be adjusted from 60 to 159 in 1-dB steps.
8	START	Pushbutton	Actuates the measurement mode.
9	PAUSE	Locking pushbutton	Interrupts the instrument operation at any time. When released, the instrument operation resumes at the point at which it was interrupted when PAUSE was actuated (provided no other control settings have been changed during PAUSE). Do not use PAUSE when the INTEGRATING light is on. It is intended for use during the OUTPUT phase.
10	STOP	Pushbutton	Stops the operation of the instrument. The START button must be used to resume operation after the STOP button has been depressed.

Table 1-4
CONCEALED FRONT-PANEL CONTROLS (1926)

Fig. 1-1 Ref.	Name	Type	Function
11	DISPLAY RATE BANDS PER SECOND	8-position rotary switch	Selects the number of bands per second to be displayed when either the XY PLOT or PRINTER mode is selected. Reset time (which occurs just before a new display) is 1 ms when PRINTER is selected or 0.5 s, when XY PLOT is selected.
12	OUTPUT DISPLAY	Seven locking pushbuttons	
	OSCILLOSCOPE		The following three buttons are for oscilloscope display and result in a display rate of 1 ms per channel.
	STORE-ERASE		In this mode, oscilloscope storage is enabled and erase takes place.
	STORE-NO ERASE		In this mode, oscilloscope storage is enabled and no erase takes place.
	NON-STORE		This mode is for standard oscilloscope use, or with a storage scope and no use of the storage feature.
	XY PLOT		X and Y outputs are enabled plus storage (for oscilloscope) pen-lift command and print command. Display rate is variable by means of DISPLAY RATE control. Reset or retrace time is 1/2 s and takes place just before new data is ready.
	PRINTER		Print command and store (for oscilloscope) are enabled. Display rate is variable by means of the DISPLAY RATE control and reset or retrace time is 1 ms. When both a printer and a plotter are used simultaneously with the analyzer, and when the 1926 controls the output rate, the XY PLOT mode can be selected.
	REMOTE ADVANCE		Used when an external device, such as a printer or computer, is to control the output rate. In this mode, all output signals are enabled.
	MANUAL ADVANCE		Used to advance channels manually when the DISPLAY RATE control is set to the position adjacent to the MANUAL button.

Table 1-4 (cont)

CONCEALED FRONT-PANEL CONTROLS (1926)

Fig. 1-1 Ref.	Name	Type	Function
13	MEASUREMENT MODE	Three interlocked pushbuttons	
	SINGLE		SINGLE mode results in one measurement period and one display period each time the START button is depressed.
	SINGLE-HOLD		SINGLE-HOLD mode results in one measurement period and repeated display periods (of the same data) each time the START button is depressed. This button must be depressed for remote selection of the MEASUREMENT MODE.
	MULTIPLE		MULTIPLE mode results in repeated cycles of one measurement period and one display period after being actuated by the START button. The process continues until "told" to stop.
14	INTEGRATION TIME SECONDS	Ten interlocked pushbuttons	Select the duration of the integration period. Selectable in octave steps from 1/8 to 32 seconds. REMOTE button in this group disengages the other 9 buttons, so that INTEGRATION TIME can be selected by remote operation.
15	PANEL DISPLAY	Locking pushbutton	Enables the BAND NUMBER and BAND LEVEL dB Nixie tubes when this button is depressed.
16	POWER	Toggle switch	Turns the instrument on and off.

1.5 ACCESSORY INSTRUMENTS.

1.5.1 General.

A few of the many ancillary devices that can be used with the 1926 Multichannel RMS Detector are noted below, together with a short description of each.

1.5.2 Multifilter, Type 1925.

The Type 1925 Multifilter is ideally suited for use with the 1926. It is a spectrum shaper, or equalizer, and is offered in several options of frequency range. Available in either 1/3-octave-band or octave-band versions, its filters conform to American and International standards. A calibrated attenuator in each filter channel permits prewhitening or weighting. The attenuation is controlled by individual thumbwheels and is indicated on a panel display. The Multifilter also includes flat, A-, B-, and C-weighting networks.

The outputs from the filter channels can be fed to the 1926 for frequency analysis and monitoring. A cable connects from the 36-terminal CHANNEL OUTPUTS connector on the 1925 to a similar 36-terminal connector labelled AJ6 CHANNEL INPUTS (TO 1925) on the rear panel of the 1926. (Both connectors mate with Amphenol plug 57-30360.) The two instruments are the basic components of the 1921 Real-Time Analyzer.

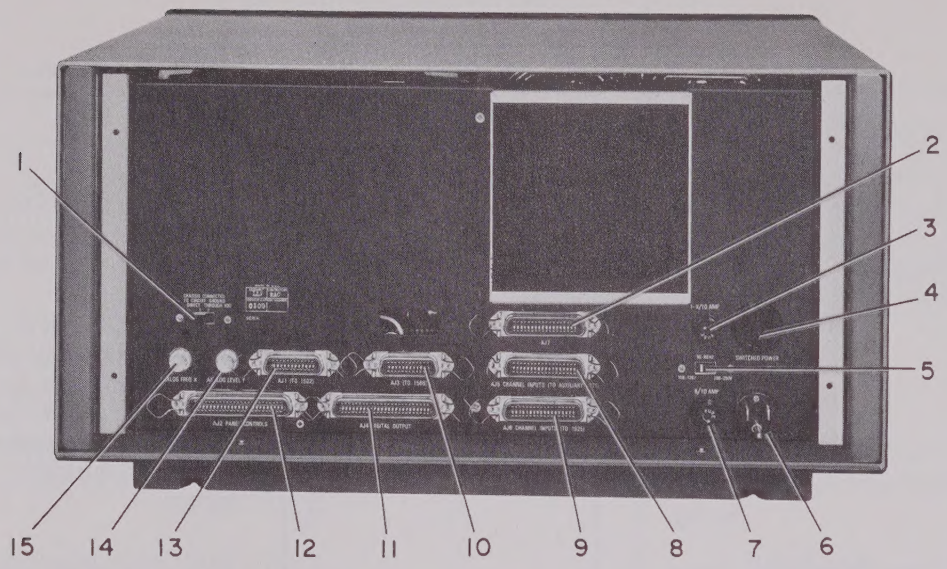


Figure 1-2. View of the rear panel showing controls, connectors and indicators.

Table 1-5
REAR-PANEL CONTROLS, CONNECTORS, AND INDICATORS

Fig. 1-2 Ref.	Name	Type	Function
1	CHASSIS CONNECTED TO CIRCUIT GROUND DIRECT– THROUGH 10 Ω	Recessed Slide Switch (See item 9 on 1925)	Connects circuit ground to chassis either directly or through a 10-Ω resistance. Should be set to 10 Ω to prevent circuit ground currents from flowing in the chassis, and the corresponding switch (9) on the 1925 should be set to DIRECT or 10 Ω, depending upon whether or not system grounding problems arise.
2	AJ7	36-terminal connector (mates with Amphenol Plug 57-30360)	Connects to X and Y outputs and commands for STORE and ERASE.
3	1 6/10 AMP	Extraction-post fuse holder	Holds a 1 6/10-A Slo-Blo fuse directly in series with high side of line. Fuse is effective for 115-V operation.

Table 1-5 (cont)

REAR-PANEL CONTROLS, CONNECTORS, AND INDICATORS

Fig. 1-2 Ref.	Name	Type	Function
4	SWITCHED POWER	3-terminal female connector	Connects to line power through POWER toggle switch on front panel. Supplies line power for operation of accessory equipment when Detector is turned on. This source of power is not fused.
5	50-60 Hz (100-125 V) (200-250 V)	Recessed slide switch	Connects power supply to accept 100- to 125-V or 200- to 250-V line.
6	——	3-terminal male connector	Line-power input connection
7	8/10 AMP	Extraction-post fuse holder	Holds 8/10-A, Slo-Blo fuse, wired between the halves of a split transformer primary winding. Effective for both 115- and 230-V operation.
8	AJ5 CHANNEL INPUTS (TO AUXILIARY 1925)	36-terminal connector (mates with Amphenol Plug 57-30360)	Connects to the highest 30 (of 45 possible) channel inputs. The first 15 are wired in parallel with the upper 15 of AJ6 CHANNEL INPUTS connector[1]
9	AJ6 CHANNEL INPUTS (TO 1925)	36-terminal connector (mates with Amphenol Plug 57-30360)	Connects to the lower 30 (of 45 possible) channel inputs.
10	AJ3 (TO1566)	24-terminal connector (mates with Amphenol Plug 57-30240)	Remote control signals for use with microphone preamplifier.
11	AJ4 DIGITAL OUTPUT	50-terminal connector (mates with Amphenol Plug 57-30500)	All digital outputs available at this socket.
12	AJ2 PANEL CONTROLS	50-terminal connector (mates with Amphenol Plug 57-30500).	Remote control signals for panel controls.
13	AJ1 (TO1522)	24-terminal connector (mates with Amphenol Plug 57-30240)	Supplies control signals and outputs for XY Recorder or 1522 DC Recorder.
14	ANALOG LEVEL Y	BNC coaxial jack	Supplies an analog voltage proportional to band level. Levels correspond to a maximum band level of 60 dB.
15	ANALOG FREQ X	BNC coaxial jack	Supplies an X-sweep ramp voltage that starts at zero when the output mode begins.

[1]Highest 15 channels are not active in standard 30-channel versions of the detector.

1.5.3 CRT Display, Type 1921-P1.

The Type 1921-P1 Storage Display Unit is a modified version of the Tektronix type 601 Storage Display Unit. Although any CRT display device having horizontal and vertical deflection sensitivity of about 1 V, full scale, can be used with the 1926, this unit is especially suitable. It provides a 3-in. by 3 7/8-in. XY plot of band levels versus band number.

A CRT display is useful for set-up and as a semi-quantitative, very fast analog output device. It is the fastest form of analog output but, of course, it produces no permanent record and it does not have as good resolution as most analog recorders. This accessory is recommended for use with the 1926 no matter what other accessories are chosen.

The 1921-P1 is supplied complete as a standard production unit with suitable interconnecting cable and graticules for use with the 1926.

1.5.4 Type 1522.

The GR 1522 DC Recorder is recommended for use with the 1926. It is a remote-programmable, high-speed, servo-type level recorder.

It operates with a short dwell as each new band level is selected, to produce a neat, rectangular bar graph, with standard scale factor. The chart drive, which provides the capability for remote programming, is produced by a stepper motor (rather than a synchronous motor). Each step moves the paper only 0.0067 in. Maximum and minimum limits that can be set anywhere along the chart are provided. This feature is useful for setting absolute maximum sound limits and provides a control signal that shuts down a device if the sound level is exceeded or if the recorder goes off scale.

The 1522, in conjunction with the 1926 Detector, produces a chart recording in about 6 seconds. Four standard chart papers are available.

1.5.5 Tape Recorder, Type 1525.

The Type 1525 Data Recorder is tailored specifically for acoustic-noise measurements. This instrument is both a sound-level meter and audio tape recorder. With it one can make on-location measurements and calibrated recordings for unhurried and detailed laboratory analysis later, or make a permanent record of once-only events. The 1525 permits recording with a flat frequency response characteristic, recommended for recording noise. Dual channels, simultaneous playback and recording, two-speed drive, and accessory tape-loop guides add versatility.

The 1525 Recorder produces a maximum output level of about 1 V to drive the Detector. A calibrate signal stored on the tape allows the calibration factor, lost in the recording process, to be restored by the 1926. The MAXIMUM LEVEL dB controls can be used to make the analyzer read out in decibels with the reference level of the original signal.

Many other tape recorders that have good dynamic range, frequency range, and stable characteristics are suitable for use with the 1926.

The 1525 Data Recorder is supplied as a standard production unit by General Radio and is directly usable with the 1926.

1.5.6 XY Plotter.

The Houston Instrument Series 6400 Omnigraphic$_{tm}$ Recorders are recommended. They are general-purpose XY recorders having the unique advantage of using paper movement for an X variable, rather than the conventional technique of moving a beam across a fixed sheet of paper. The use of fan-fold paper having a series of independent grids gives the user sequentially presented XY plots. Each graph can be detached to yield a plot identical to that obtained from a standard XY recorder; or it can be kept in the fanfold sequence and referred to like a page in a book. Chart advance can be controlled manually, automatically or remotely. The paper movement can also be reversed, in order that repetitive trace plots can be run.

Conventional XY plotters can also be used with the 1926 but they are not recommended because they require paper loading and, therefore, reduce the potential speed advantages. The Houston 6420-024 and 6450-024 operate completely automatically with the 1926, which supplies appropriate pen-up, pen-down, and chart-advance signals to the recorder, as well as a 1-V peak, X-axis sweep signal.

The Houston recorders can be supplied by GR complete with suitable interconnecting cable and chart paper in conjunction with the 1926 Detector, or as part of a larger analyzer system; or they can be purchased directly from Houston Instrument.

1.5.7 Data Printer.

The MDS Franklin Series-800 HI-Speed Digital Printer records, on paper tape, a list of the band numbers and band levels supplied to it by the 1926 Detector. American Standard Band Numbers (S1.6) and levels in dB, with virtually any desired reference level, are printed.

The printer should be used when most accurate numerical data is desired. Time can be saved by printing band levels directly rather than reading them from a plotted curve.

The Detector supplies band-number and band-level information in BCD 1-2-4-8 code serially by band, with standard TTL-logic levels. Any data printer that has a capacity of seven columns or more, and will accept the code and logic levels, can be used with the analyzer. When a rapid succession of measurements is to be made and printed, it is important that the printer be fast. This minimizes the time needed to output data and maximizes the time available for measurement.

The MDS 800 Printer operates synchronously with the Detector in the REMOTE ADVANCE output mode at a speed of 12 lines per second. Thus, a thirty-band measurement is printed in less than 3 seconds.

The printer can be supplied by GR complete with a suitable printing format and interconnecting cable in conjunction with a 1926, or as part of a system, or it can be purchased directly from Mohawk Data Sciences.

1.5.8 IBM Card Punch Coupler.

The Type 1791 Card-Punch Coupler is used to transfer data from digital measurement devices to an IBM 526 Printing Summary Punch, which then records the data automatically on punched cards. The coupler converts the parallel BCD information from the measurement device to the serial 10-line contact closures required by the punch. In addition to the punch, parallel data-processing instruments (data printers, etc) can be connected to the coupler.

A coupler for use with the Detector can be supplied by GR.

1.5.9 Computer Equipment.

The Digital Equipment Corporation Programmed Data Processor — 8/L (PDP-8/L) is a small-scale general-purpose computer. The PDP-8/L is a one-address, fixed-word-length, parallel computer using 12-bit, two's complement arithmetic. Cycle time of the 4096-word random-address magnetic-core memory is 1.6 μs. Standard features of the system include indirect addressing and facilities for instruction skipping and program interruption as functions of input-output device conditions.

A small digital computer used in conjunction with the 1926 can perform any or all of four basic functions:

1. Detector Control — The computer can be programmed to select all functions that are normally controlled manually with front-panel controls.

2. Rapid Data Storage — The computer can ingest the results of a measurement in about 1 ms, thus freeing the Detector to make another. The stored results of the series of measurements are then typed out from the computer.

3. Comparison — The computer can compare the results of a measurement with a stored reference spectrum and make a decision, depending on their relation. For example, a noisy device can be rejected when its spectrum exceeds limits. The computer can also be programmed to provide information as to where limits have been exceeded, by what amount, and the probable cause.

4. Data Reduction — The computer can be used to reduce the spectral information from the Detector to obtain various ratings. For example, programs can be supplied to find loudness level, speech-interference level, and other ratings. Complete Analyzer/Computer systems, including suitable interface hardware, can be supplied by GR.

1.5.10 Line-Voltage Regulator.

The accuracy of measurements accomplished with precision electronic test equipment operated from ac line sources can often be seriously degraded by fluctuations in primary input power. Line-voltage variations as much as ±15% are commonly encountered, even in laboratory environments. Although most modern electronic instruments incorporate some degree of regulation, possible power-source problems should be considered for every instrumentation setup. The use of line-voltage regulators between power lines and the test equipment is recommended as the only sure way to rule out the effects on measurement data of low line voltage, transients, and other power phenomena.

The General Radio Type 1591 Variac® Automatic Voltage Regulator is a compact and inexpensive equipment capable of holding ac line voltage within 0.2% accuracy for input ranges of ±13%. It will assure, for example, that an instrument rated for 100-125 (or 200-250) V can be operated reliably in spite of input transients in the range 85-140 (or 170-280) V. The 1 kVA capacity of the 1591 will handle a rack full of solid-state instrumentation with no distortion of the input waveform. This rugged electromechanical regulator comes in bench or rack-mount versions, each with sockets for standard 2- or 3-wire instrument power cords.

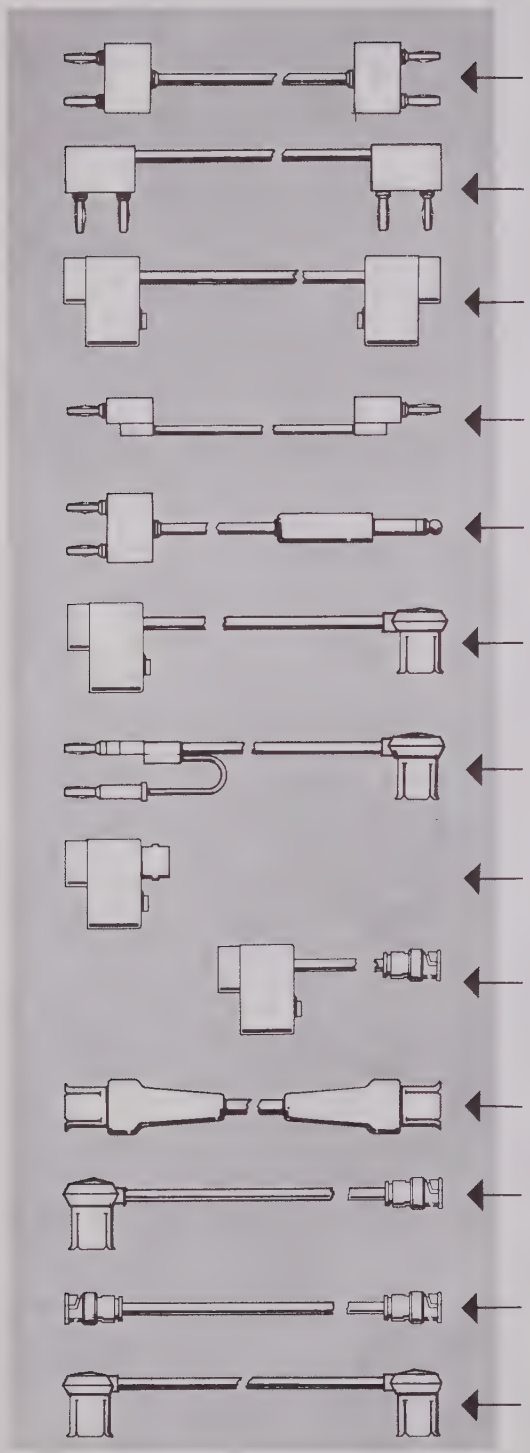
1.6 PATCH CORDS AND ADAPTORS.

A wide variety of GR patch cords is available, as well as a full line of adaptors to convert the terminals for use with most commercial and military connectors. Some of these are listed in Table 1-6.

Further details can be found in your GR catalog or in the *GR Experimenter* for October, 1967.

Table 1-6

AVAILABLE INTERCONNECTION ACCESSORIES



TYPE NO.	DESCRIPTION	CATALOG NO.
274-NQ	Double-plug patch cord, in-line 36" long	0274-9860
274-NQM	Double-plug patch cord, in-line 24" long	0274-9896
274-NQS	Double-plug patch cord, in-line 12" long	0274-9861
274-NP	Double-plug patch cord, right-angle 36" long	0274-9880
274-NPM	Double-plug patch cord, right-angle 24" long	0274-9892
274-NPS	Double-plug patch cord, right-angle 12" long	0274-9852
274-NL	Shielded double-plug patch cord, 36" long	0274-9883
274-NLM	Shielded double-plug patch cord, 24" long	0274-9882
274-NLS	Shielded double-plug patch cord, 12" long	0274-9862
274-LLB	Single-plug patch cord, black, 36" long	0274-9468
274-LLR	Single-plug patch cord, red, 36" long	0274-9492
274-LMB	Single-plug patch cord, black, 24" long	0274-9847
274-LMR	Single-plug patch cord, red, 24" long	0274-9848
274-LSB	Single-plug patch cord, black, 12" long	0274-9849
274-LSR	Single-plug patch cord, red, 12" long	0274-9850
1560-P95	Adaptor cable, double-plug to telephone plug, 36"	1560-9695
874-R34	Coaxial patch cord, double plug to GR874, 36" long	0874-9692
874-R33	Coaxial patch cord, two plugs to GR874, 36" long	0874-9690
274-QBJ	Adaptor, shielded double plug to BNC jack	0274-9884
776-A	Patch cord, shielded double plug to BNC plug, 36" long	0776-9701
874-R22A	Coaxial patch cord GR874 to GR874, 36" long	0874-9682
776-B	Patch cord, GR874 (right-angle) to BNC plug, 36" long	0776-9702
776-C	Patch cord, BNC plug to BNC plug, 36" long	0776-9703
776-D	GR874 to GR874, both right-angle, 36" long	0776-9704

274-13XA

2-69

Installation—Section 2

2.1 POWER-LINE CONNECTION 2-1
2.2 DIMENSIONS 2-2
2.3 BENCH MODELS 2-2
2.4 RELAY-RACK MODELS 2-2
2.5 GROUNDING 2-3
2.6 INTERFERENCE FROM STRAY FIELDS 2-4
2.7 USE OF FRONT-PANEL CONTROL COVER 2-4
2.8 LINE-VOLTAGE REGULATION 2-4

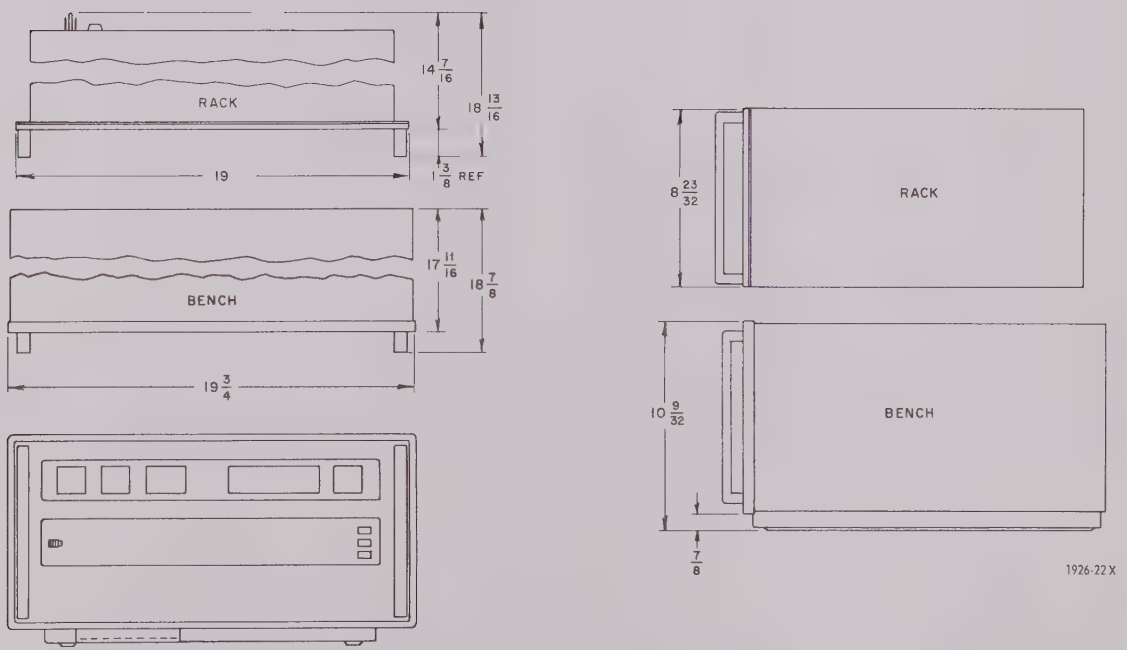


Figure 2-1. Dimensions of the Detector in inches.

2.1 POWER-LINE CONNECTION.

With the Detector placed in position on a bench or in a relay rack, set the recessed slide switch (19, Figure 1-2) on the rear panel to the range corresponding to the power-line voltage to be used. (Voltage is indicated by position of white line.) Connect the instrument to the line power; use the 3-terminal power cord supplied (P/N 4200-9622). Turn ON the POWER switch on the front panel.

Two Slo-Blo fuses are installed in extraction-post fuse holders on the rear panel. A 1 6/10-A fuse (F501) is effective for both 115- and 230-V operation; an 8/10-A fuse (F502) is effective for 230-V operation only.

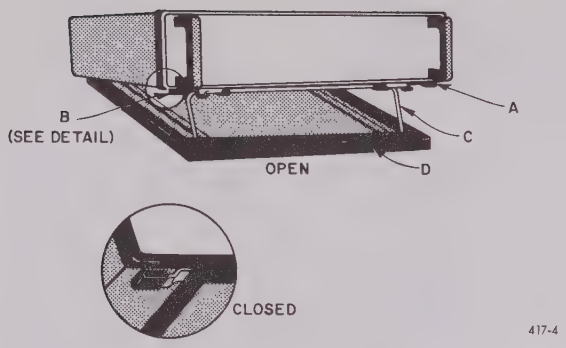


Figure 2-2. The bail can be used to tilt the instrument, to provide a better view of the front-panel indicators.

2.2 DIMENSIONS.

The dimensions of the 1926 Multichannel RMS Detector are given in Figure 2-1 for both the bench and rack models.

2.3 BENCH MODELS.

2.3.1 Tilting.

The bench models of the Detector are delivered completely assembled in a metal cabinet, ready for bench use. A convenient bail, located along the bottom front edge of the instrument, can be pulled down to raise the front and provide a better view of the front-panel indicators (see Figure 2-2). To tilt the instrument, proceed as follows:

a. Place the right thumb on the right-hand release toggle (A) and the left thumb on the left-hand release toggle (B) under the front corners of the instrument.

b. Push both release toggles toward the rear as far as they will go.

c. Using the rear of the base (C) as a pivot, lift the front of the instrument, permitting the bail (D) to drop down on the base.

d. With one hand, hold the instrument in the tilted position; with the other, pull the bail forward as far as it will go and carefully lower the instrument. The bail is now locked in place and the instrument will remain in the tilted position.

Reverse this procedure to eliminate the tilt. Be sure the toggles are pushed back, toward the rear of the instrument. Then lower the front carefully onto the base. Lock the base to the bottom of the instrument by sliding the toggles (A and B) forward.

2.3.2 Cabinet Removal.

To remove a bench-model instrument from its cabinet:

Remove the four panel screws (A, Figure 2-3), P/N 7270-6310, two on each side of the front panel. These are No. 10-32, 9/16-in. screws, with nylon washers. To loosen them, insert a Phillips-head screwdriver through the holes in the handles, as shown in the figure. Then pull the instrument forward, out of the cabinet.

2.3.3 Conversion to Relay-rack Mount.

To convert a bench model for relay-rack use, order from GR one Rackable Cabinet Assembly, P/N 4174-3685, and one Hardware Set, P/N 4174-2005. Then proceed as follows:

a. Disconnect all cables from the rear of the instrument, remove the four panel screws (A, Figure 2-3), and pull the instrument forward, out of the cabinet (refer to paragraph 2.3.2).

b. From the rear, remove the four screws (B) holding the rear cover (P/N 4171-1926) to the bench cabinet and remove the cover.

c. Proceed with the relay-rack installation, as given in paragraph 2.4.1.

2.4 RELAY-RACK MODELS.

2.4.1 Installation.

Relay-rack models of the Detector are supplied with Rackable Cabinet Assembly P/N 4174-3685, and Hardware Set, P/N 4174-2005. The items in the Hardware Set are listed in Table 2-1.

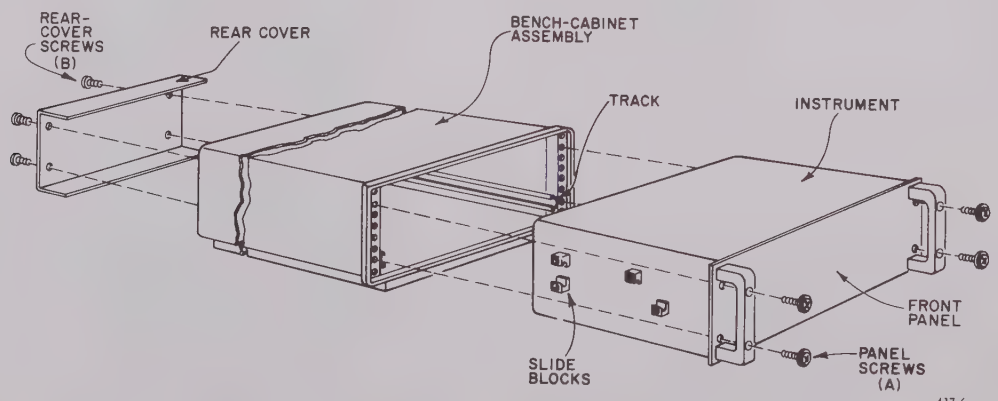


Figure 2-3. The bench model is easily removed from its cabinet.

Table 2-1
ITEMS IN HARDWARE SET P/N 4174-2005

Fig. 2-4 Ref.	Number Supplied	Item
C	8	Screws, pan-head, thread-cutting, 10-32, ½ in.
D	2	Brackets, L-shaped, P/N 4171-8521
E	4	Screws, pan-head, thread-cutting, 8-32, 3/16 in.

To install a rack-model instrument in an EIA standard RS-310 19-in. relay rack, with universal mounting-hole spacing, proceed as follows:

a. Remove the four panel screws (A, Figure 2-4) slide the instrument forward, out of the rack cabinet, until it stops. Raise the front edge slightly to release the stops. The instrument can then be completely removed from the rack cabinet.

b. From the rear, remove the rear-cover screws (B) holding the rear cover to the rack cabinet and remove the cover.

c. Insert the rack cabinet in the rack and secure it to the front rails of the rack with the four front-support screws (C).

d. If the rack contains a rear support, attach the brackets (D) to the rack cabinet, using the rear support screws (E), through the clearance holes in the bracket. Use the set of slots in the cabinet that properly aligns clearance holes in the brackets with threaded holes in the rear rail of the relay rack.

e. Secure the brackets to the rear rails, using rear-bracket screws (C).

f. Place the rear edge of the instrument in the rack cabinet so that the rear slide blocks (F) engage the track. Slide the instrument into the cabinet, making sure that the front slide blocks (G) also engage the tracks. Lock the instrument in the cabinet with the four panel screws (A) with nylon washers. (Tighten these screws by inserting a Phillips-head screwdriver through the holes in the handles).

g. Replace the rear cover and lock it in place using the rear-cover screws (B).

By removing the four panel screws (A), one can slide the instrument forward, out of the rack cabinet on the extendable tracks (see Figure 2-4). The tracks will still support the instrument for easy access to its interior.

2.4.2 Conversion to Bench Mount.

To convert a relay-rack model for bench use, order a Bench Cabinet Assembly (P/N 4172-4003). Disconnect all cables from the rear of the instrument. Remove the rear-cover screws (B, Figure 2-4) and remove the rear cover. Remove the four panel screws (A, Figure 2-4), two on each side of the front panel. To loosen them, insert a Phillips-head screwdriver through the holes in the handles (see Figure 2-4). Pull the instrument forward on the extendable tracks. Raise the front of the instrument slightly; it will then slide free of the tracks.

Slide the instrument into the bench cabinet and lock it in place with the four front-panel screws, A. Attach the rear cover to the back of the cabinet; use the four rear-cover screws, B, Figure 2-3.

2.5 GROUNDING.

In system installations, where several instrument chassis are in electrical contact, it is important that the signal currents follow well-defined paths. A two-position slide switch (15, Figure 1-2, labelled CHASSIS CONNECTED TO CIRCUIT GROUND) on the rear panel of the 1926 permits either a direct connection of the instrument chassis to the circuit ground or separation of the chassis from the circuit ground by insertion of a 10-Ω resistance. This switch is normally used in the DIRECT position. However, if cross-talk or hum is troublesome, use of the THROUGH

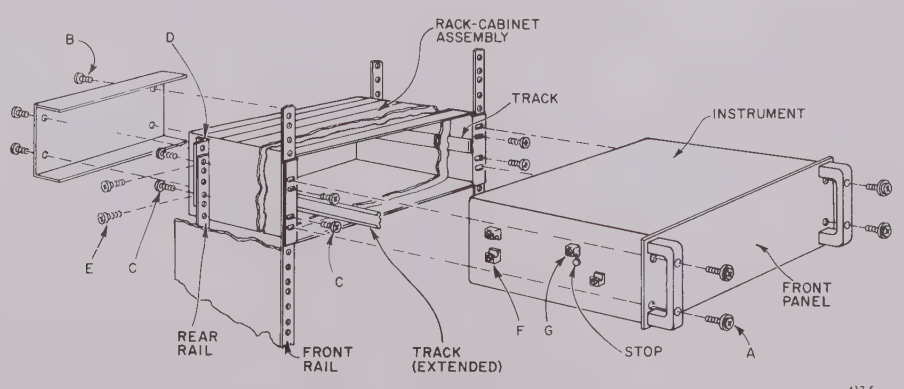


Figure 2-4. Method of mounting the Detector in a relay rack.

10Ω position may eliminate the problem. The 10-Ω value is high enough to prevent signal currents from being conducted through the chassis, but it is low enough to provide good cabinet shielding.

2.6 INTERFERENCE FROM STRAY FIELDS.

The Detector is a sensitive instrument that can be used with input-signal levels of 100 μV or less. Thus, it is susceptible to interference from the strong electric or magnetic fields sometimes generated by devices being used near it. The possibility of interference should be kept in mind when the 1926 is installed with other equipment. To reduce the interference, increase the spacing between the instruments or change the orientation of the equipment. If the interference is extreme, additional magnetic or electric shielding of either the noise source or the Detector may be necessary.

2.7 USE OF FRONT-PANEL CONTROL COVER.

A protective cover (P/N 1926-1200) is supplied, to be placed across the lower portion of the front panel, to cover the controls and prevent accidental altering of their settings. The right-hand edge of the cover is slipped under the right-hand edge of the panel cutout so that the lower row of controls is concealed. To lock the cover in place, push the slide at the left end of the cover to the left; to unlock it, push the slide to the right.

Figure 2-5. Front panel with the protective cover assembly in place.

Operation–Section 3

3.1 GENERAL 3-1
3.2 MEASUREMENT PHASE 3-1
3.3 OUTPUT PHASE 3-6
3.4 REMOTE CONTROL 3-9

3.1 GENERAL.

The 1926 Multichannel RMS Detector has many combinations of input and output controls to suit a great variety of applications. To simplify the use and explanation of these controls, it is best to consider separately the two functional phases, MEASUREMENT phase and OUTPUT phase, which occur for each operating cycle.

During the MEASUREMENT phase, the INTEGRATING light is on in the 1926 and input signals are being measured and stored in a nondestructive memory. All possible input and calibration channels are measured (no matter what output settings are called for), and no outputs are available at this time. Duration of the MEASUREMENT phase is determined by the INTEGRATION TIME setting.

The MEASUREMENT phase is initiated by the START button. Successive initiations may be automatic, as selected by the MEASUREMENT MODE controls. If the STOP button is depressed, the MEASUREMENT phase is terminated and can be resumed only by use of the START button. (It is not recommended that PAUSE be used during the MEASUREMENT phase, because a measurement error may occur on the channel that is being measured at the time of pause.)

During the OUTPUT phase, the measurements are converted to decibels, when needed, for output presentation. No degradation of measured levels can occur during the OUTPUT phase. This phase may automatically repeat (if the SINGLE-HOLD MEASUREMENT MODE is used); otherwise a single presentation of the output data is made. The time duration of a single output presentation depends upon the output device being used and can be as short as 15 μs or as long as desired.

The PAUSE control is intended for use during the OUTPUT phase, so that an output device can be adjusted, or any output controls changed, without loss of the stored measurements.

3.2 MEASUREMENT PHASE.

3.2.1 Signal Input Connections.

Two sockets for the connection of input signals are located on the rear panel. The CHANNEL INPUTS socket (AJ6) is used for the first 30 channels (see Figure 3-1). The auxiliary CHANNEL INPUTS socket (AJ5) has parallel connections to the 15 high-numbered channels for the 45-channel version of the 1926 Detector (Figure 3-2).

The channels are numbered from 1 to 45 and are distinct from STANDARD BAND numbers, which apply to filter-frequency specifications. The BAND NUMBER, displayed at the output, may be different from the channel number, which is assigned at the input connector (refer to paragraph 3.2.2).

Figures 3-1 and 3-2 show the pin connections to the CHANNEL INPUTS connectors, AJ6 and AJ5, respectively. The GND connection ties to circuit ground and the CH GND connection ties to the chassis.

Input impedance is 5.1 kΩ and is capacitor coupled (refer to paragraph 4.2.1).

3.2.2 Band-Number Designation.

To facilitate interpretation of the output data, the serial input-channel numbering can be transposed to a different serial band-numbering sequence. For example, the Type 1925 Multifilter utilizes STANDARD BAND numbers that identify the filter center frequencies. The 1926 Detector band-number output sequence is adjustable to correspond to these numbers.

When sold as a separate instrument, the 1926 RMS Detector is adjusted to make the band numbers correspond to channel numbers. In this case, the CALIBRATE channel for full scale appears as BAND number 0 and the bottom scale CALIBRATE channel appears as BAND number 63. To obtain these calibration channels, set the LOWEST BAND NUMBER control to 63 for both calibration channels, or to 0 to get only the full-scale check (refer to Tables 3-1 and 3-2). When used with a 1925 Multifilter, the band numbers of the 1926 Detector are adjusted to correspond to those of the 1925 Multifilter. In this case, the CALIBRATE channels appear at the two bands below the lowest 1925 Multifilter band number.

The BAND NUMBER designation can be changed by the following procedure:

Thirty-Band Systems

Standard 1921 thirty-band systems have 30 active channels and two calibration channels.

The proper circuit connections for any particular version of the Multifilter are made on a patch board (P/N 1925-2740) located on the under side of the chassis. These connections are made before the instrument leaves the factory and no changes should be required. Table 3-1 lists the connections that must be made on etched-circuit board P of the 1926 to obtain the listed correspondences between the channels within the instrument and the band numbers by which they are identified to the outside. Note that, regardless of the connections made with the numbered leads, the lettered connections must be as follows:

H to K
A to B
E to F
L to N

To display the calibration channels, it is sometimes necessary to employ band numbers 62 and/or 63. While it may seem illogical, these bands must be addressed by the front-panel control marked LOWEST BAND NUMBER. For example, if the instrument is connected so that the first active channel is displayed as band 0, and it is desired to display both calibration channels and then bands 0 to 5, inclusive, the LOWEST BAND NUMBER control must be set for 62 and the HIGHEST BAND NUMBER control for 5.

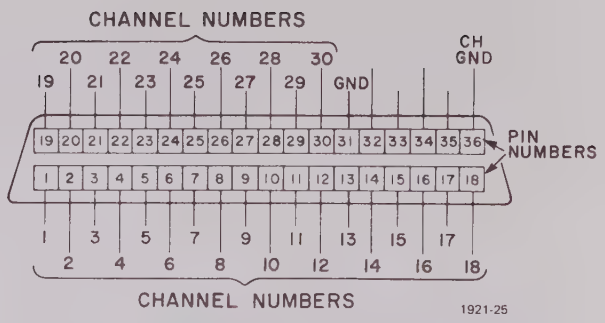


Figure 3-1. The first 30 channels connect as shown, to socket AJ6 of the 1926.

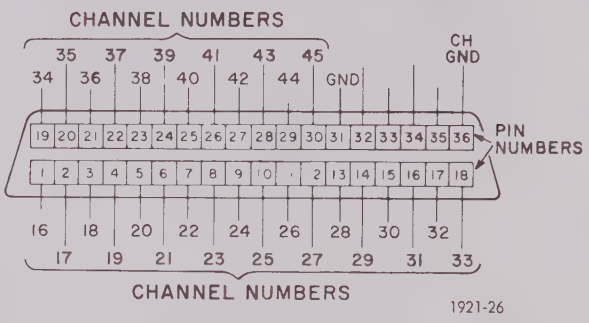


Figure 3-2. For the 45-channel versions, the upper 30 channels connect as shown, to socket AJ5 of the 1926.

Forty-five-band Systems.

Forty-five band systems have 45 active channels and two calibration channels. Table 3-2 lists the connections that must be made on etched-circuit board P to obtain the listed correspondences between the channels within the the instrument and the band numbers by which they are identified to the outside. Note that, regardless of the connections made with the numbered leads, the lettered connections must be as follows:

G to H
B to C
D to E
L to M

To display the calibration channels, it is sometimes necessary to employ band numbers 62 and/or 63. While it may seem illogical, these bands must be addressed by the front-panel control marked LOWEST BAND NUMBER. For example, if the instrument is connected so that the first active data channel is displayed as band 1, and it is desired to display both calibration channels and then bands 1 to 7, inclusive, the LOWEST BAND NUMBER control must be set for 63 and the HIGHEST BAND NUMBER for 7.

To connect a 30-channel 1925 Multifilter to a 45-channel 1926 Detector, use the data given in Table 3-1.

Table 3-1

1926 P-BOARD WIRING—30-CHANNEL SYSTEM

Band Assignments					
Active Channels		*Calibration Channels*		*Connect Leads*	
1st	*30th*	*0 dB*	*60 dB*	*to + bus*	*To – bus*
0	29	63	62	1, 2, 3, 8, 14	10
1	30	0	63	1, 2, 3, 8, 10, 14	NONE
2	31	1	0	NONE	1, 2, 3, 8, 10, 14
3	32	2	1	10	1, 2, 3, 8, 14
4	33	3	2	8	1, 2, 3, 10, 14
5	34	4	3	8, 10	1, 2, 3, 14
6	35	5	4	3	1, 2, 8, 10, 14
7	36	6	5	3, 10	1, 2, 8 14
8	37	7	6	3, 8	1, 2, 10, 14
9	38	8	7	3, 8, 10	1, 2, 14
10	39	9	8	1	2, 3, 8, 10, 14
11	40	10	9	1, 10	2, 3, 8, 14
12	41	11	10	1, 8	2, 3, 10, 14
13	42	12	11	1, 8, 10	2, 3, 14
14	43	13	12	1, 3	2, 8, 10, 14
15	44	14	13	1, 3, 10	2, 8, 14
16	45	15	14	1, 3, 8	2, 10, 14
17	46	16	15	1, 3, 8, 10	2, 14
18	47	17	16	2	1, 3, 8, 10, 14
19	48	18	17	2, 10	1, 3, 8, 14
20	49	19	18	2, 8	1, 3, 10, 14

Table 3-2
1926 P-BOARD WIRING—45-CHANNEL SYSTEM

Band Assignments				*Connect Leads*	
Active Channels		*Calibration Channels*			
1st	*45th*	*0 dB*	*60 dB*	*to + bus*	*to − bus*
0	44	63	62	1, 2, 3, 8, 14	10
1	45	0	63	1, 2, 3, 8, 10, 14	NONE
2	46	1	0	NONE	1, 2, 3, 8, 10, 14
3	47	2	1	10	1, 2, 3, 8, 14
4	48	3	2	8	1, 2, 3, 10, 14
5	49	4	3	8, 10	1, 2, 3, 14

3.2.3 Maximum Band-Level Calibration.

The MAXIMUM BAND LEVEL dB control changes the digital output numbers in 1-dB steps. It has no effect on the analog outputs and does not change the Analyzer sensitivity or gain adjustments. It is provided as a means of referring measurements to some convenient reference source.

At its minimum setting of 60 dB, a full-scale input of 1 V, rms, produces an output of 60 dB and a bottom scale input of 1 mV, rms, produces an output of 0 dB. In other words, the 1926 Detector digital outputs are calibrated in decibels above 1 mV, for a MAXIMUM BAND LEVEL dB setting of 60 dB.

As an example of a systems application, suppose the 1926 is driven by a sound-level meter whose gain is such that a 1-V output corresponds to an input sound-pressure level of 74 dB, referred to 20 $\mu N/m^2$. Setting the MAXIMUM BAND LEVEL dB control to 74 dB will calibrate the 1926 digital output to read directly the sound-pressure level in dB re 20 $\mu N/m^2$.

As another example, suppose the 1926 is driven by a tape recorder (whose maximum output is 1 V, rms), and the data includes a known calibration signal that plays back at less than 1 V, rms. First, measure the calibration signal in the SINGLE-HOLD MEASUREMENT MODE. While observing the digital output from this measurement, adjust the MAXIMUM BAND LEVEL dB control until the digital output agrees with the calibration signal level. Now, the 1926 Detector is calibrated to measure the recorded data directly in dB referred to the recorded reference level.

3.2.4 Selection of Integration Time.

INTEGRATION TIME is the period of time over which the input data is measured. Nine choices are provided, in octave steps, from 1/8 to 32 seconds.

The measurement sample rate or the number of samples taken is determined by the INTEGRATION TIME (refer to Table 3-3). The maximum average sample rate is 1024 samples per second per channel, and the maximum number of samples taken is 1024 per channel. Below one second, fewer samples are taken (at a rate of 1024 per second) and above one second the sample rate reduces while a total of 1024 samples is maintained.

For measuring random signals, the greatest accuracy is obtained when the sample spacing exceeds the signal correlation time. Correlation time is defined as the minimum time spacing between independent samples. Each sample is then statistically independent. The average sample spacing is also shown in Table 3-3.

An uncertainty is always associated with measurement of a random signal and is reduced as the number of independent measuring samples is increased. This phenomenon is due to the source (and not the 1926 Detector) and is expressed by the 80% confidence limits shown in Figure 3-3. These limits apply for independent measurement samples of a random input signal having a Gaussian amplitude probability distribution.

A very long correlation time may result in less than 100 independent samples, for a random input. A curve of the 80% confidence limits versus independent samples is shown in Figure 3.3, as a guide to the variation in measurement that is to be expected for a random signal with a Gaussian

Table 3-3
INTEGRATION-TIME PARAMETERS

Integration Time—Seconds	1/8	1/4	1/2	1	2	4	8	16	32
No. of Samples Taken	128	256	512	1024	1024	1024	1024	1024	1024
Avg. Sampling Rate	1024	1024	1024	1024	512	256	128	64	32
Avg. Sample Spacing—ms	0.781	0.813	0.877	1.00	2.01	4.02	8.04	16.08	32.2
80% Confidence Limits for Independent Samples (Noise Input) — ± dB	0.5	.34	.24	.17	.17	.17	.17	.17	.17

distribution. On the average, 80% of all measured values will lie within the bounds of Figure 3-3 (except for possible absolute errors due to the 1926).

Transient input signals.

For input data of limited duration, the INTEGRATION TIME should, ideally, be slightly shorter than the data duration. A slight overlap of data duration allows for synchronization of the start of input data and the start of the MEASUREMENT PHASE.

If the INTEGRATION TIME is longer than the data duration, some samples will be taken when there is zero input and the resulting measured value will be low. For example, suppose the INTEGRATION TIME is twice the duration of the input data and half of the samples are taken with zero input. The resulting measurement will be 3 dB lower than the data rms level but, of course, will be true value for the signal level presented to the 1926 Detector, during its integration period.

It is important that the start of the MEASUREMENT PHASE be accurately synchronized to the start of the input data for short-duration signals. Also, if the INTEGRATION TIME is longer than the input data, a correction must be applied to compensate for a partly zero input. Figure 3-4 is a plot of the approximate correction versus excess integration time. Such a correction should be based on percent of samples missed (rather than percent INTEGRATION

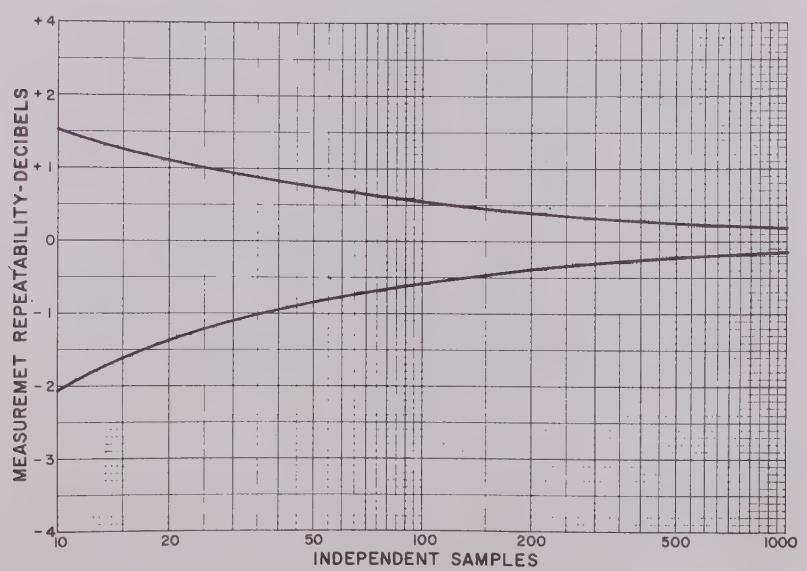


Figure 3-3. Measurement bounds for 80% confidence limits with a Gaussian noise source.

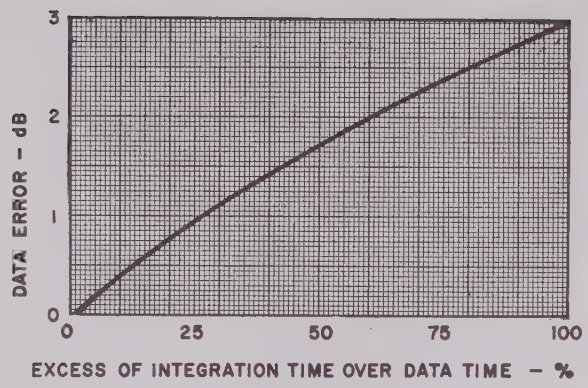


Figure 3-4. Approximate data correction for excess integration time. Percent integration time = 100 (integration time – data time) ÷ data time.

TIME) to be accurate. This is not feasible, however, since the sample spacing is non-uniform in time.

Steady-state input signals. No synchronization problem exists for input signals of unlimited duration; the choices of INTEGRATION TIME and START of the MEASUREMENT PHASE are dictated by other considerations.

Maximum measurement accuracy is achieved for INTEGRATION TIME of 1 second and longer (refer to Table 3-3). However, some knowledge of the input-signal correlation time (independent sample time) is necessary before this choice can be made. The average sample spacing should be greater than the correlation time if a maximum number of independent samples is to be taken.

The variation of the 80% confidence limits indicated by Table 3-3 is small (for the number of independent samples shown) and this is, perhaps, a minor point for consideration. However, for the common case where measurements are being made of a relatively narrow band of noise, the input signal will have a rather long correlation time. A long INTEGRATION TIME may be necessary to obtain even 100 ***independent*** input samples.

Figures 3-5 and 3-6 are excellent illustrations of the measurement uncertainties associated with having a small number of independent samples. The curves (80% and 99% confidence limits, respectively,) represent what is obtainable from a 1/3-octave filter (such as the 1925 Multifilter) for INTEGRATION TIME of the 1926 Detector of 32, 1, and 1/8 seconds. At low frequencies, where the correlation time is long, it is seen that the measurement uncertainty is relatively large.

The average rate of sampling for the 1926 Detector is below the maximum frequency range of 100 kHz. A low sample rate is of no consequence for the sake of rms-level measurements but would be an important consideration if we were attempting to reconstruct an input signal (sampling would have to be at or above the Nyquist rate). What is of importance is avoiding coherence between an input-signal frequency and an integral multiple of the sampling frequency. This possibility is avoided by modulating the sampling rate (refer to paragraph 4.2).

3.2.5 Input-Signal Duration.

Input signals to the 1926 Detector are sampled at discrete instants of time. Signal levels that occur between sample instants do not affect the measured result. A minimum time duration for pulse or transient signals must be imposed, therefore, to ensure that several sampling instants will coincide with signal peaks.

Average spacing between samples is a parameter that depends upon integration time, as shown in Table 3-3. A safe limit for minimum signal duration equals the average sample spacing and is, therefore, 1 ms times the integration time in seconds, for an integration time longer than 1 s, and is 1 ms otherwise.

A pulsed input signal will not coincide with all sample instants and several measurements of zero signal level will occur, effectively reducing the number of samples per measurement period. It should be remembered that measurement accuracy decreases as the number of signal samples is reduced. A discussion of this effect for noise inputs is given in paragraph 3.2.4.

3.2.6 Measurement Mode.

There are three MEASUREMENT MODE controls on the 1926, designated SINGLE, SINGLE-HOLD, and MULTIPLE.

The SINGLE MODE uses one MEASUREMENT PHASE and one OUTPUT PHASE. This mode must be initiated by a START command and is terminated automatically when the OUTPUT PHASE is complete.

The SINGLE-HOLD mode would be used when only one measurement is needed (or can be taken; e.g., transient data) and it is desired to store the measurement in memory for continuous output (for multiple printer or XY copies, etc.) The SINGLE-HOLD MODE uses one MEASUREMENT PHASE and a continuous sequence of OUTPUT PHASE operations.

The MULTIPLE MODE is a continuous sequence of SINGLE MODE operations. It is initiated by a START command and is terminated by a STOP command. The MULTIPLE MODE is used when continuous observation (real-time operation) of input data is desired.

3.3 OUTPUT PHASE.

3.3.1 Display.

Bands Displayed. In the MEASUREMENT MODE, all possible input channels are measured and stored in memory. Only those channels of interest are presented as outputs, however, during the **Output Phase**.

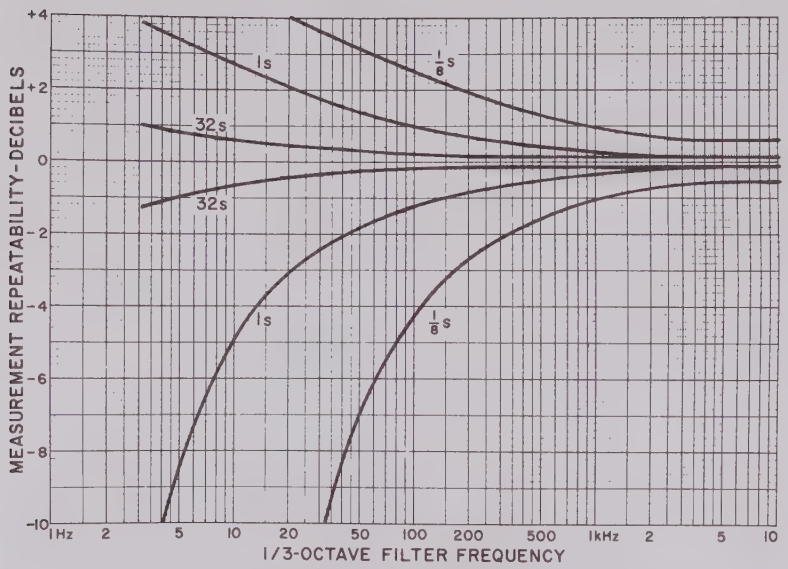


Figure 3-5. Confidence limits (80%) for a white Gaussian noise input.

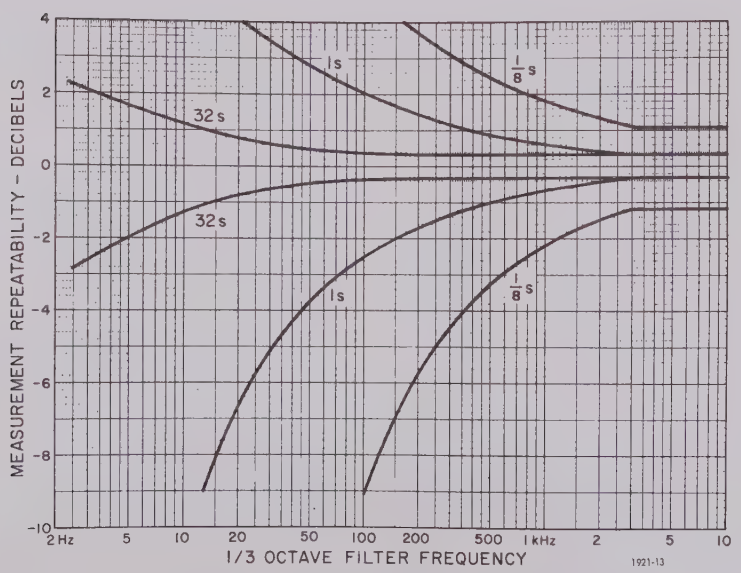


Figure 3-6. Confidence limits (99%) for a white Gaussian noise input.

Output data is always presented in sequence by **Band Number.** Control of the bands displayed is determined by setting the LOWEST BAND NUMBER and the HIGHEST BAND NUMBER controls to include the desired channels.

Display Rate. The rate of data output from the 1926 Detector can be controlled in one of three ways:

1. Automatically, at a pre-selected DISPLAY RATE;
2. Manually, using the MANUAL ADVANCE;
3. By remote command, using the REMOTE ADVANCE.

The DISPLAY RATE control is used to pre-select a display rate for the OUTPUT DISPLAY modes of X-Y PLOT and PRINTER.

NOTE

DISPLAY RATE is inoperable for any of the OSCILLOSCOPE DISPLAY modes, which use a fixed display rate of 1 ms per band. A reset time of 0.5 s is provided at the start of each "store-erase" display to allow for erasing a storage oscilloscope

For REMOTE ADVANCE, an external advance command pulse is required for each band displayed (except the first band). The highest display rate possible in this mode is 15 μs per band. There is no limit to how slowly the data can be displayed.

3.3.2 Use of Calibration Channels.

Two extra channels (with no external connections) are provided for automatic calibration of full-scale and bottom-scale levels. They are measured during every measurement phase and are available to be displayed, if desired. The calibrate-channel positions precede the first active input channel. Refer to paragraph 3.2.2 and Table 3-1 for the number designation of the calibration channels.

To display the calibration channels when the active channels are between 2 and 49, set the LOWEST BAND NUMBER control to the lowest input band number minus two. For example, if the first input channel is designated as band number 11, set the LOWEST BAND NUMBER control to 9.

The calibrate channels can be used as a self-check feature to monitor continuously the operation of the 1926 Detector or to record the setting of the MAXIMUM BAND LEVEL dB control. In this case, calibrate channels would be displayed during each output phase.

In addition, the calibrate channels are used to calibrate an analog output device, such as an XY plotter or oscilloscope. For this application, the 1926 Detector is first operated for one measurement with the following control settings:

LOWEST BAND NUMBER – "full-scale" calibrate channel
HIGHEST BAND NUMBER – "bottom-scale" calibrate channel
MAXIMUM BAND LEVEL dB – 60
PANEL DISPLAY – on
INTEGRATION TIME, SECONDS – 1
MEASUREMENT MODE – SINGLE - HOLD
OUTPUT DISPLAY – XY PLOT or PRINTER
DISPLAY RATE – MANUAL ADVANCE

The first band displayed should read 60 dB and is used to set the full-scale point of the output device. Next press the MANUAL ADVANCE button; the output should read 0 dB; this point is used to set the 0-dB point of the output device.

3.3.3 Output Devices.

Oscilloscope. (Refer to separate instructions for the 1921-P1 Storage Display Unit.) Three operating modes are provided for oscilloscope use and are: STORE-ERASE, STORE-NO ERASE, and NON STORE. Their functions are self explanatory and follow the designations with regard to STORE for storage oscilloscope and ERASE for erasure of a storage oscilloscope pattern. Display rate is fixed at 1 ms per channel for oscilloscope display. Retrace time of the X-axis output is 0.5 ms. Always connect the oscilloscope to pins 1 and 21 on connector AJ7 of the 1926 (***not*** to the ANALOG FREQ X and ANALOG LEVEL Y terminals). A 5000-pF capacitor placed across the input terminals to the scope will help to eliminate any distortion in the signal.

A storage command appears as a 15-V level at the oscilloscope output connector (AJ7). Erase command is a 15-V pulse of 0.5-second duration, and occurs at the start of the OUTPUT phase.

X-Y Plot. The X-Y PLOT button engages the DISPLAY RATE control and enables the control signals for pen lift and page advance. A suitable display rate for the Houston Type 6420-024 Plotter is two bands per second. During the page-advance period (0.5 s), the pen is commanded to lift.

Recorder. The GR Type 1522 DC Recorder is operated by REMOTE ADVANCE. The 1522 supplies a signal to the 1926 for band advancing, so that the output data can be recorded at a rate limited by the writing speed of the 1522.

Multiple-Output Devices. The 1926 Detector output has serial access (by channel) to the stored measurement data during the OUTPUT PHASE. Hence, if multiple DISPLAY RATE settings are desired for multiple-output devices, they must be obtained sequentially, using the SINGLE-HOLD MEASUREMENT MODE.

Many devices can be operated simultaneously, as listed below:

1. X-Y Plotter, Printer, Nixies, Storage Oscilloscope.
2. Printer, Nixies, Storage Oscilloscope.
3. Storage Oscilloscope, Computer.

Table 3-4
OUTPUT-DISPLAY CONTROL FUNCTIONS

	Display Rate Bands/ms	*Reset Time*	*X*	*Y*	*Erase*	*Store*	*Print Command*	*Pen Up Command*	*Page Advance*
OSCILLOSCOPE STORE-ERASE	1	0.5 ms	0	0	1	1	0	0	0
STORE–NO ERASE	1	1 ms	0	0	0	1	0	0	0
NON-STORE	1	1 ms	0	0	0	0	0	0	0
X-Y PLOT	VARIABLE (1-64 bands/s in binary sequence)	0.5 s	1	1	0	1	1	1	1
PRINTER	VARIABLE (1-64 bands/s in binary sequence)	1 ms	0	0	0	1	1	0	0
REMOTE ADVANCE	EXTERNAL	EXTERNAL	1	1	1	1	1	1	1

For the first combination, the X-Y PLOT mode is used, because this mode provides a 0.5-s period for resetting or reloading paper. The DISPLAY RATE must be set to accomodate the slowest device. All necessary control signals are available (refer to Table 3-4).

For the second combination, the PRINTER mode is used. If it is desired to control the display rate externally, however, the REMOTE ADVANCE mode is used and the display rate can be controlled by the printer.

Table 3-4 illustrates the signals and control functions that are activated for each setting of the OUTPUT DISPLAY. A signal or control command is not available, as indicated by a 0; or it is available, as indicated by a 1.

To use an oscilloscope and a computer, set the OUTPUT DISPLAY OSCILLOSCOPE to either STORE-NO ERASE or NON-STORE. (The STORE-ERASE mode requires an extra 0.5 s for erasing.) This will provide a 1-ms-per-band DISPLAY RATE, which is compatible with both devices. A signal from the computer that says it has not read or is reading the data can be used to remotely command a PAUSE, to ensure that all data will be read by the computer.

3.4 REMOTE CONTROL (Refer to par. 3.4.8).

3.4.1 General.

All functions except the PANEL DISPLAY lamp switch and DISPLAY RATE – BANDS PER SECOND are capable of being programmed from voltage levels on the rear-panel connectors. The requirements for this control are listed below.

NOTE

The word "ground" means either to connect to circuit ground or reduce the potential below ≈ 0.25 V by any other means, such as a saturated transistor or an integrated circuit capable of sinking about 1.6 mA.

3.4.2 Lowest Band Number.

Set front-panel thumbwheel switches to blank, 0. Then–

For TENS, ground as follows:

0–9	No Grounds
10–19	AJ2–38
20–29	AJ2–39
30–39	AJ2–38 and AJ2–39
40–49	AJ2–13

For UNITS, ground as follows:

0	No Grounds
1	AJ2–36
2	AJ2–37
3	AJ2–36 and AJ2–37
4	AJ2–11
5	AJ2–11 and AJ2–36
6	AJ2–11 and AJ2–37
7	AJ2–11 and AJ2–37 and AJ2–36
8	AJ2–12
9	AJ2–12 and AJ2–36

3.4.3 Highest Band Number.

Set front-panel thumbwheel switches to blank, 0. Then—

For TENS, ground as follows:

0–9	No Grounds
10-19	AJ2–42
20–29	AJ2–43
30–39	AJ2–43 and AJ2–42
40–49	AJ2–17

For UNITS, ground as follows:

0	No Ground
1	AJ2–40
2	AJ2–41
3	AJ2–40 and AJ2–41
4	AJ2–15
5	AJ2–15 and AJ2–40
6	AJ2–15 and AJ2–41
7	AJ2–15 and AJ2–41 and AJ2–40
8	AJ2–16
9	AJ2–16 and AJ2–40

3.4.4 Integration Time - Seconds.

Press the front-panel button marked REMOTE within the button group headed INTEGRATION TIME – SECONDS. This enables the external control over integration time. Now ground the following terminals:

1/8 s	AJ2–5 and AJ2–30
1/4 s	AJ2–5 and AJ2–31
1/2 s	AJ2–5 and AJ2–32
1 s	AJ2–5
2 s	AJ2–6
4 s	AJ2–7
8 s	AJ2–8
16 s	AJ2–9
32 s	AJ2–10

3.4.5 Measurement Mode.

To control MEASUREMENT MODE from external signals, press the SINGLE-HOLD (REMOTE) button. Then ground the following pin connections:

For SINGLE, ground AJ2-3

For SINGLE-HOLD, no grounds

For MULTIPLE, ground AJ2-28

3.4.6 Stop–Start–Pause.

To stop operations, ground either of the following for at least 250 ns: AJ2-2 or AJ3-18.

This is a permanent stop. Operation is killed completely, and the only way to resume operation is to begin from the beginning with a new start.

To START operations, ground AJ2-26 for at least 250 ns.

To PAUSE, ground AJ2-44. The PAUSE condition continues as long as this terminal is grounded. Removing the ground (or returning the voltage on this terminal to between +3 and +5 V) restores operation within 0.5μs.

NOTE

If PAUSE is operated during integration time, the voltage stored from the most recently taken sample may change, giving an error in one sample out of 1024, but will be no cause for concern.

3.4.7 Output Display.

General. The selection of output display can be made by a contact to ground. First, it is necessary that none of the buttons in the OUTPUT DISPLAY group be depressed. To release all buttons, gently and slowly press any button that is not in. When the button being pressed is about half way in, the one already in will pop out. As soon as this happens, release the button being pushed before it latches into a pushed-in state.

Oscilloscope Store-Erase. Ground terminal AJ2-19 on the rear panel. The output will consist of the display of each channel in turn, starting with the LOWEST BAND NUMBER and ending with the HIGHEST BAND NUMBER. Each channel is displayed for approximately 1 ms. When the display is completed, the trace stored on the scope remains until 0.5 s before the next display sequence is to start, and is then erased automatically.

Oscilloscope Store - No Erase. Ground terminal AJ2-20 on the rear panel. The output will be displayed as described in the paragraph above, but erasure of the storage scope trace does not occur.

Non-Store. Ground terminal AJ2-21 on the rear panel. In this mode of operation, the storage and erase features are both disabled. The time a trace remains on the screen is determined by the persistence of the phosphor. Display rate is 1 ms per channel. This mode is used with storage scopes when they are not to store, and with oscilloscopes that do not have storage capability.

X-Y Plot. This is a slow mode of display. It is achieved by grounding terminal AJ2-22 on the rear panel and setting the actual display rate in bands-per-second by means of the DISPLAY RATE–BANDS PER SECOND switch at the right-hand side of the front panel.

NOTE

The setting of this switch is not programmable from external voltages, currents, or contact closures.

A printer may also be used when the X-Y PLOT is enabled. If a scope is used simultaneously, the scope is programmed to STORE-NO ERASE.

Before the next display sequence can take place, a 0.5-s time interval is provided for advancing the plotter to the next sheet of paper, whether or not the particular plotter in use has automatic paper advance.

Printer. This is also a slow mode of display. Ground terminal AJ2-23 on the rear panel. The DISPLAY RATE-BANDS PER SECOND switch must be set for the desired display rate. Depending on the printer, this will usually be 2, 4, or 8. A scope may be used simultaneously, and is connected for STORE-NO ERASE.

Nixies. The Nixie tubes can be viewed only at relatively slow rates. The best choice for viewing Nixies is the PRINTER display (refer to paragraph above). If the printer is not wanted when viewing Nixies, it should be turned off.

Remote Advance. REMOTE ADVANCE is selected by grounding either AJ2-24 or AJ4-20. This display mode is intended for use with instruments that can "talk back," reporting, in effect, "I have processed the data you sent. Now give me a new band's worth of data." The talk-back signals must be of at least 250 ns duration, and provide transitions between nominal +5-V and 0-V levels.

CASE I. When talk-back signal is a pulse going to 0 V from a customary level of +5 V. Apply this pulse to either AJ1-9 or AJ4-19. Ground either AJ1-2 or AJ4-45.

CASE II. Report-back signal is a pulse going to +5 V from a customary level of 0 V. Apply this pulse to either AJ1-2 or AJ4-45. Both AJ1-9 and AJ4-19 must be open-circuited.

When REMOTE ADVANCE is selected, the display time per channel is controlled entirely by the external device. The only limitation is that the external device must not call for a new band more often than every 15 μs.

When REMOTE ADVANCE is selected, voltages are available for X-Y recorders (subject to note below), and the ERASE, STORE conditions are selected for a scope. PRINT commands are generated for a printer, and PEN DOWN and PEN UP commands for an X-Y plotter.

NOTE

Because the external device controls the display time per channel, the voltage developed on the X-axis output terminals (the ANALOG FREQUENCY BNC connector) is unpredictable. When an external device is controlling the display time, it is well to let the same external device generate the X-axis sweep voltage, if scopes or XY recorders are used simultaneously.

Manual Advance. The action of MANUAL ADVANCE may be achieved by external electrical commands. The OUTPUT DISPLAY mode must be either X-Y PLOT or PRINTER, because these are the only display modes in which MANUAL ADVANCE is possible. The X-Y PLOT or PRINTER modes can be initially established either by pushing the front-panel buttons or by making electrical connections as explained above. Once the mode is selected, set the DISPLAY RATE – BANDS PER SECOND switch to MANUAL. Then manual advance is accomplished either by pushing the MANUAL ADVANCE button or by momentarily (a few microseconds or more) grounding terminal AJ2-27 on the rear panel.

3.4.8 Option for 15-V Logic.

Etched-circuit board W is available on special order for use with printers and other devices requiring 15-V logic levels for the band number and band level dB.

3.4.9 Index of External Signals.

General. Tabulated below are external-control signal functions for the 1926 and signal interface data with respect to accessory instruments. All relate to rear-panel multipin connectors on the 1926 unit and are displayed in the reference designator order of the connectors.

As arranged in connector groupings, the data in the left-hand column are the signal-identifying codes used on the detail circuit schematics, next is the pin number location and finally the signal description.

NOTES

Each pin number is followed by an impedance code as follows:

– Essentially zero, as from emitter followers, power supplies, or ground connections.

* Output impedance of TTL integrated circuit, nonlinear, but about 25 to 100 Ω in low-voltage state and about 100 to 200 Ω in high-voltage state.

(Output impedance of DTL integrated circuit, nonlinear, but about 25 to 100 Ω in low-voltage state and about 6000 Ω in high-voltage state.

+ If instrument has board W designed for 15-V levels, output impedance is about 12,000 Ω in high-voltage state and 25 to 100 Ω in low-voltage state. If instrument has 5-V output levels, impedance corresponds to output impedance of TTL integrated circuit. See * listing for this impedance.

= Output impedance varies with setting of internal voltage divider. Will be about 125 Ω.

$ Low-impedance output (few tens to few hundreds Ω) from linear integrated circuit.

/Special case, described on same line as pin-number listing.

NO SYMBOL. An input rather than an output. Device supplying signal to this point must operate between nominal levels of 0 and +5 V, and be capable of sinking 1.6 mA, dc, in the 0-V state.

Table 3-5
CONNECTOR AJ1 – TO 1522 OR HOUSTON INSTRUMENTS RECORDER

RECUR	AJ1-1	=	X-axis voltage to XY plotters. Voltage appears on this line only when the XY PLOT or REMOTE ADVANCE buttons are pushed. Otherwise, this line is at ground potential.
HEATH	AJ1-2		"SHIFT-TO-NEXT-CHANNEL" Command. Positive pulse lasting 0.25 μs or longer will cause the next channel to be displayed during the output phase of operation, provided the REMOTE ADVANCE button is pushed or REMOTE operation is established by grounding AJ2-24. (Compare to HASTE.)
GNDCH	AJ1-3	–	Chassis Ground. Makes connection to the metal case of the instrument.
GNDCH	AJ1-4	–	Chassis Ground. Makes connection to the metal case of the instrument.
RHINO	AJ1-5	/	Recognizes 1522 has advanced to new page, capacitor coupled, Z_{in} = 1500 Ω, approx. The photocell on the 1522 that "sees" the black stripe marking the start of a new recording chart causes the voltage on this line to go from +5 V to 0 V. The 1926 generates a motor stop pulse to end the paper motion of the 1522, and the 1926 makes a new measurement, replots the same data, or quits, depending on the MEASUREMENT MODE button.
RESIN	AJ1-6	/	Motor stop for 1522 paper drive, Z_{out} = 2200 Ω when voltage is +5, and about 100 Ω when voltage is 0. Voltage on this line is normally +5. When the voltage drops to 0, the 1522 paper transport motor stops. Motor stop signal is a pulse lasting approximately 50 μs (time not at all critical), going from +5 to 0 V in less than 1 μs and from 0 V back to +5 with a more-or-less long, sloppy exponential recovery.
GUEST	AJ1-7	*	This voltage goes to 0 at the moment display starts, and remains at 0 V until display ends. The voltage is +5 during non-display times. The voltage remains at 0 all through display, including the time of about 14.5 μs while the channel just displayed is being replaced with the value for the next channel. (Compare to PADDY, equivalent signal of opposite polarity.) "Displayed" refers to channels actually being displayed. For example, if an instrument is designed to use channels 14-43, but only channels 20-25 are set by the LOWEST BAND NUMBER and HIGHEST BAND NUMBER switches, then line GUEST is at 0 V only while the internal circuits are working with channels 20-25.
REACH	AJ1-8	(	"ADVANCE-TO-NEW-PAGE" Command for Houston Instrument and similar XY plotters. Just before a new set of data are to be plotted, the voltage on this line goes from 0 to +5 for approximately 1/2 s. This is a command to the Houston Instrument plotter to bring a new sheet of paper onto the platen, and the time delay of 1/2 s allows the paper movement to finish.
HASTE	AJ1-9		"SHIFT-TO-NEXT-CHANNEL" Command. (Compare to HEATH.) This input causes the next channel to be displayed during the output phase of operation, provided the REMOTE ADVANCE button is pushed or REMOTE operation is established by grounding AJ2-24. A pulse going from +5 V to 0 V and back to +5, lasting 0.25 μs or longer is required. If channel advance is desired from "downgoing" pulses of the type just described, they must be applied to AJ1-09, whereas "upgoing" pulses will work correctly only on AJ1-02. IMPORTANT: If AJ1-09 is used for channel advance with downgoing pulses, contact AJ1-02 ***must*** be connected to Signal Ground, AJ2-13.
MACAW	AJ1-10	+	***Each time*** a new channel is displayed, the voltage on this line rises from 0 to +5 V, if XY PLOT, PRINTER, or REMOTE ADVANCE buttons are pressed, or the equivalent of pressing these buttons is achieved by grounding lines RAGED, RACKS, or HEART on connector AJ2. During the time of approximately 14.5 μs necessary to change from one channel to the next, the voltage on this line drops back to 0.
GNDSG	AJ1-12	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
GNDSG	AJ1-13	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
RENEW	AJ1-14		When the 1926 is used with the General Radio Type 1522 Recorder, this point is brought to ground potential when the recorder is present and turned on. This enables the automatic advance to a new chart after a plot is completed.

Table 3-5 cont.

REFER	AJ1-15	$	Y Axis voltage to XY plotters. Voltage appears on this line only when the XY PLOT or REMOTE ADVANCE buttons are pushed. Otherwise, this line is at ground potential.
GNDCH	AJ1-16	–	Chassis Ground. Makes connection to the metal case of the instrument.
RHYME	AJ1-17		Recognizes photocell mark when 1522 chart paper has reached the end of one channel and causes the paper to stop. Voltage on this line is normally +5, and goes to 0 V at the moment the mark is "seen."
REPAY	AJ1-18	/	Motor-start signal for 1522 paper drive, Z_{out} = 2200 Ω when voltage is +5, and about 100 Ω when voltage is at 0. Normally at +5 V; drop to 0 V initiates start of paper motion.
PADDY	AJ1-19	*	This voltage goes to +5 at the moment display starts, and remains at +5 until display ends. The voltage is 0 during non-display times. The voltage remains at +5 all through display, including the time of about 14.5 μs while the channel just displayed is being replaced with the value for the next channel. (Compare to GUEST, equivalent signal of opposite polarity.) "Display" refers to channels actually being displayed. For example, if an instrument is designed to use channels 14-43, but only channels 20-25 are set by the LOWEST BAND NUMBER and HIGHEST BAND NUMBER switches, then line PADDY is at 5 V only while the internal circuits are working with channels 20-25.
RANCH	AJ1-20	(	Pen-control voltage. This signal operates only when enabled by pressing the XY PLOT or REMOTE ADVANCE buttons. This voltage goes to +5 at the moment display starts, and remains at +5 until display ends. The voltage remains at +5 all through display, including the time of about 14.5 μs while the channel just displayed is being replaced with the value for the next channel. Note similarity to signal PADDY at AJ1-19, except RANCH works only with XY PLOT and REMOTE ADVANCE.
PLS05	AJ1-21	–	Positive 5 V, dc. This is intended as a reference voltage, and comes from the same power supply that feeds the integrated circuits in the 1926. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS05 pins on all other connectors, does not exceed 200 mA. This voltage will have many "spikes" of several tenths of a volt on it. Do not use it for anything that requires clean, well-filtered power.
MIN20	AJ1-22	–	Negative 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the MIN20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
PLS20	AJ1-23	–	Positive 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.

Table 3-6
CONNECTOR AJ2 – PANEL CONTROLS

FRIAR	AJ2-1	Ground this point to "START." Reducing the potential at this terminal from +5 to 0 V (contact closure to Signal Ground or the electronic equivalent, such as through a saturated transistor switch) for 0.25 μs or longer causes a new measurement to begin.
GRAVY	AJ2-2	Ground this point to "STOP." Reducing the potential at this terminal from +5 to 0 V (contact closure to Signal Ground or the electronic equivalent, such as through a saturated transistor switch) for 0.25 μs or longer causes all activity in the 1926 to stop (except for jitter on the XY Plotter or CRO, if STOP occurs while an overloaded channel is displayed). Operation can be made to resume only by a new START command.
GLASS	AJ2-3	Ground for programming SINGLE type of MEASUREMENT MODE. Reduce the potential on this line from +5 to 0 V by contact closure to Signal Ground or the electronic equivalent, such as through a saturated transistor switch. The voltage must remain at ground potential during the entire sequence of integration and display. See note under GLARE.
GNDSG	AJ2-4	Signal ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
GLINT	AJ2-5	Ground for integration times of 1/8, 1/4, 1/2, and 1 second (note that, for 1/8, 1/4, and 1/2 second, another line must be grounded also). Reduce the potential on this line from +5 V to 0 V (contact closure to Signal Ground or the electronic equivalent, such as through a saturated transistor switch) and retain the potential at 0 V during the entire integration time, at least. Normally this point is left at ground potential as long as measurements are made of 1 s or less duration.
GLOAT	AJ2-6	Ground for 2-second integration time. Contact closure or equivalent to Signal Ground. The potential must remain at 0 for the entire integration time, at least. Normally this point is left at ground potential as long as measurements are made of 2-seconds duration.
GLOBE	AJ2-7	Ground for 4-second integration time. See remarks under GLOAT.
GLOOM	AJ2-8	Ground for 8-second integration time. See remarks under GLOAT.
GOING	AJ2-9	Ground for 16-second integration time. See remarks under GLOAT.
GORGE	AJ2-10	Ground for 32-second integration time. See remarks under GLOAT.
ERUPT	AJ2-11	External programming of LOWEST BAND NUMBER, value 4 in BCD. Contact closure or equivalent to Signal Ground. To make external programming of LOWEST BAND NUMBER or HIGHEST BAND NUMBER possible, front-panel switches must be set to 00. Normally the selected LOWEST BAND NUMBER and HIGHEST BAND NUMBER BCD addresses are left at ground potential as long as measurements are being made with the same starting and ending points for displayed bands. In any case, the selected LOWEST BAND NUMBER and HIGHEST BAND NUMBER programming voltages must remain at ground potential during the entire duration of any one output operation.
ERECT	AJ2-12	Ground to program LOWEST BAND NUMBER, value 8 in BCD. See notes under ERUPT.
ENVOY	AJ2-13	Ground to program LOWEST BAND NUMBER, value 40 in BCD. See notes under ERUPT.
FACET	AJ2-15	Ground to program HIGHEST BAND NUMBER, value 4 in BCD. See notes under ERUPT.
FABLE	AJ2-16	Ground to program HIGHEST BAND NUMBER, value 8 in BCD. See notes under ERUPT.
EXCEL	AJ2-17	Ground to program HIGHEST BAND NUMBER, value 40 in BCD. See notes under ERUPT.
RACES	AJ2-19	Ground this line to achieve external programming of OUTPUT DISPLAY, OSCILLOSCOPE, STORE-ERASE. Make contact closure or equivalent to Signal Ground. To make external programming of OUTPUT DISPLAY possible, the front-panel OUTPUT DISPLAY pushbuttons must all be released. Normally, line RACES is left at ground potential as long as you desire the STORE-ERASE mode, but, in any event, it must stay at ground potential during the entire duration of any one output operation.
RABID	AJ2-20	Ground this line for external programming of OUTPUT DISPLAY, OSCILLOSCOPE, STORE-NO ERASE. See general comments under RACES.
RAFTS	AJ2-21	Ground this line for external programming of OUTPUT DISPLAY, XY PLOT. Printer is simultaneously enabled, and oscilloscopes are put into store-no erase display mode. See general comments under RACES.
RAGED	AJ2-22	Ground this line for external programming of OUTPUT DISPLAY, PRINTER. Oscilloscopes are simultaneously put into store-no erase display mode. See general comments under RACES.

RACKS	AJ2-23		Ground this line for external programming of OUTPUT DISPLAY, PRINTER. Oscilloscopes are simultaneously put into store-no erase display mode. See general comments under RACES.
HEART	AJ2-24		Ground this line for external programming of REMOTE ADVANCE. Simultaneously enables XY PLOT, PRINTER, and CRO STORE-NO ERASE. See general comments under RACES. Note that fully-remote operation as enabled by bringing HEART to ground potential will also involve signals moving back and forth on lines HASTE, HEATH, LARGE, LOYAL, and LUCID, or some combination thereof.
HANDY	AJ2-26		Ground this point to "START." See FRAIR, AJ2-01. HANDY operates in identically the same way as far as considerations external to the 1926 are concerned.
FRESH	AJ2-27		Ground for MANUAL ADVANCE. Bringing this wire from +5 to 0 V potential for 0.25 μs or more will have the same effect as pushing the MANUAL ADVANCE button. BEWARE CONTACT BOUNCE if a device like a pushbutton is used. The normal MANUAL ADVANCE button drives elaborate anti-bounce circuits. These circuits are not available for commands entering the instrument from this connection point.
GLARE	AJ2-28		Ground for programming MULTIPLE type of MEASUREMENT MODE. Reduce the potential on this line from +5 to 0 V by contact closure to Signal Ground or the electronic equivalent, such as through a saturated transistor switch. The voltage must remain at ground potential continuously as long as MULTIPLE action is desired. NOTE: For SINGLE-HOLD, leave both GLASS and GLARE ungrounded.
ANNOY	AJ2-30		Ground for 1/8-second integration time. GLINT must be grounded also. See general comments under GLINT.
ANVIL	AJ2-31		Ground for 1/4-second integration time. GLINT must be grounded also. See general comments under GLINT.
ANTIC	AJ2-32		Ground for 1/2-second integration time. GLINT must be grounded also. See general comments under GLINT.
GNDSG	AJ2-35		Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
EVADE	AJ2-36		Ground to program LOWEST BAND NUMBER, value 1 in BCD. See notes under ERUPT.
ESSAY	AJ2-37		Ground to program LOWEST BAND NUMBER, value 2 in BCD. See notes under ERUPT.
EQUIP	AJ2-38		Ground to program LOWEST BAND NUMBER, value 10 in BCD. See notes under ERUPT.
EPOCH	AH2-39		Ground to program LOWEST BAND NUMBER, value 20 in BCD. See notes under ERUPT.
FAITH	AJ2-40		Ground to program HIGHEST BAND NUMBER, value 1 in BCD. See notes under ERUPT.
FAINT	AJ2-41		Ground to program HIGHEST BAND NUMBER, value 2 in BCD. See notes under ERUPT.
EXILE	AJ2-42		Ground to program HIGHEST BAND NUMBER, value 10 in BCD. See notes under ERUPT.
EXALT	AJ2-43		Ground to program HIGHEST BAND NUMBER, value 20 in BCD. See notes under ERUPT.
RELIC	AJ2-44		Ground to "PAUSE." Reducing potential on this line from +5 to 0 V by contact closure to Signal Ground or equivalent method such as a saturated transistor switch stops operations of the 1926, both in the integrate and display modes. When the grounded condition is terminated, operation resumes just where it was interrupted.
MIN20	AJ2-46	–	Negative 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the MIN20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
PLS20	AJ2-47	–	Positive 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
PLS05	AJ2-48	–	Positive 5 V, dc. This is intended as a reference voltage, and comes from the same power supply that feeds the integrated circuits in the 1926. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS05 pins on all other connectors, does not exceed 200 mA. This voltage will have many "spikes" of several tenths of a volt on it. Do not use it for anything that requires clean, well-filtered power.
DITCH	AH2-49	*	"Integration" indicator. This line is at +5 V when integration is in progress, and at 0 V when the instrument is in the output (display) mode.
GNDCH	AJ2-50	–	Chassis Ground. Makes connection to the metal case of the instrument.

Table 3-7
CONNECTOR AJ3 FOR USE WITH GENERAL RADIO TYPE 1566 SCANNER.

FRAUD	AJ3-1		Ground to use 8 microphones. Notes: When the General Radio Type 1566 is in use, grounding this line causes the 1926 to pause after each 1/8th portion of the integration samples (1/2 for FRILL, 1/4 for FRIED, 1/16th for FRANK). Simultaneously, the 1926 sends a command to the 1566 to turn on the next microphone in the set of 8 (or 2, 4, 16 for FRILL, FRIED, FRANK).
FRANK	AJ3-2		Ground to use 16 microphones. See notes under FRAUD.
GNDSG	AJ3-3	–	Signal ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
MONEY	AJ3-4	+	Command to advance to next microphone. This is the simultaneous command mentioned in the notes under FRAUD. The signal consists of a transition from +5 V to 0 V (+15 to 0 if Board W is of the 15-V type). The 0-voltage condition continues until the 1566 sends back a signal indicating it has advanced to the next microphone. During the time of waiting for the microphone switching, all activity in the 1926 is stopped.
DITCH	AJ3-5	*	"Integration" indicator. This line is at +5 V when integration is in progress, and at 0 V when the instrument is in the output mode.
DIRGE	AJ3-6	*	"Display" indicator. This line is at +5 V when the output mode is in progress, and at 0 V when integration is in progress. Note: DIRGE and DITCH are the exact opposites of each other.
PADDY	AJ3-7	*	This voltage goes to +5 at the moment display starts, and remains at +5 V until display ends. The voltage is 0 during non-display times. The voltage remains at +5 all through display, including the time of about 14.5 μs while the channel just displayed is being replaced with the value for the next channel. "Display" refers to channels actually being displayed. For example, if an instrument is designed to use channels 14-43, but only channels 20-25 are set by the LOWEST BAND NUMBER and HIGHEST BAND NUMBER switches, then line PADDY is at 5 V only while the internal circuits are working with channels 20-25.
PLS05	AJ3-8	–	Positive 5 V, dc. This is intended as a reference voltage, and comes from the same power supply that feeds the integrated circuits in the 1926. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS05 pins on all other connectors, does not exceed 200 mA. This voltage will have many "spikes" of several tenths of a volt on it. Do not use it for anything that requires clean, well-filtered power.
DOLLY	AJ3-9		Ground to program MAXIMUM BAND LEVEL dB, value 4 BCD. Notes applicable to DITTY, DODGE, DOLLY, DONOR, DOUGH, DRAFT, DRAKE, and DRAMA: Grounding these lines causes the selected BCD values to be programmed as the MAXIMUM BAND LEVEL dB. "Grounding" refers to bringing the potential on these lines to 0 V, either by contact closure to Signal Ground, or an electronic equivalent, such as a saturated transistor switch. Normally, the selected lines are left continuously at ground potential until you wish to use a different value of MAXIMUM BAND LEVEL dB. In any case, the selected lines must remain at ground potential at least while the desired channels are being displayed. To make programming of the MAXIMUM BAND LEVEL dB possible, the front-panel MAXIMUM BAND LEVEL dB switches must be set to 60.
DONOR	AJ3-10		Ground to program MAXIMUM BAND LEVEL dB, value 8 BCD. See notes under DOLLY.
DRAKE	AJ3-11		Ground to program MAXIMUM BAND LEVEL dB, value 40 BCD. See notes under DOLLY.
DRAMA	AJ3-12		Ground to program MAXIMUM BAND LEVEL dB, value 80 BCD. See notes under DOLLY.
FRILL	AJ3-13		Ground to use 2 microphones. See notes under FRAUD.
FRIED	AJ3-14		Ground to use 4 microphones. See notes under FRAUD.
GNDCH	AJ3-15	–	Chassis Ground. Makes connection to the metal case of the instrument.
HABIT	AJ3-16		"Resume" command after changing microphones. This line is the reply-back point for a signal from the 1566 that the next microphone in sequence has been turned on and integration may resume in the 1926. The signal must be a pulse going from +5 V to 0 and back to +5, lasting at least 0.25 μs, but not to exceed a few ms. Exact shape not critical.

Table 3-7 cont.

FRIAR	AJ3-17	Ground this point to "START." Reducing the potential at this terminal from +5 to 0 V (contact closure to Signal Ground or the electronic equivalent, such as through a saturated transistor switch) for 0.25 μs or longer causes a new measurement to begin.
GRAVY	AJ3-18	Ground this point to "STOP." Reducing the potential at this terminal from +5 to 0 V (contact closure to Signal Ground or the electronic equivalent, such as through a saturated transistor switch) for 0.25 μs or longer causes all activity in the 1926 to stop (except for jitter on the XY plotter or CRO if STOP occurs while an overloaded channel is displayed). Operation can be made to resume only by a new START command.
MIN20	AJ3-19	– Negative 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the MIN20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
PLS20	AJ3-20	– Positive 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
DITTY	AJ3-21	Ground to program MAXIMUM BAND LEVEL dB, value 1 BCD. See notes under DOLLY.
DODGE	AJ3-22	Ground to program MAXIMUM BAND LEVEL dB, value 2 BCD. See notes under DOLLY.
DOUGH	AJ3-23	Ground to program MAXIMUM BAND LEVEL dB, value 10 BCD. See notes under DOLLY.
DRAFT	AJ3-24	Ground to program MAXIMUM BAND LEVEL dB, value 20 BCD. See notes under DOLLY.

Table 3-8
CONNECTOR AJ4—DIGITAL OUTPUT

			Note 1: Lines so designated are at +5 V when in the "1," "true," "on," "yes," "addressed," etc., state. They are at 0 V otherwise. These lines designate the band number being displayed and the value of the answer for the corresponding band number, all in BCD, except fractions (1/4, 1/2) of a dB, which are in binary. If board W is of the 15-V type, "+5 V" becomes "+15 V."
MEDAL	AJ4-1	+	dB out, 1/4 dB, binary. Note 1.
GNDSG	AJ4-2	—	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
MARRY	AJ4-3	+	dB out, 1/2 dB, binary. Note 1.
MEDAL	AJ4-4	+	dB out, 1/4 dB, binary. Note 1.
MIDST	AJ4-5	+	dB out, 1 dB, BCD. Note 1.
MOURN	AJ4-6	+	dB out, 2 dB, BCD. Note 1.
MARCH	AJ4-7	+	dB out, 10 dB, BCD. Note 1.
MEATY	AJ4-8	+	dB out, 20 dB, BCD. Note 1.
MERIT	AJ4-9	+	dB out, 100 dB, BCD. Note 1.
GNDSG	AJ4-10	—	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case
RECAP	AJ4-11	*	Signal indicating a band is being displayed; +5 V during the display of each individual band, going to 0 V during the 14.5 μs time intervals while the band just displayed is replaced by the next band to be displayed.
MOLAR	AJ4-12	+	"Integration" indicator. This line is at +5 V (+15 if Board W is of the 15-volt type) when integration is in progress, and at 0 V when the instrument is in the output mode.
MIRTH	AJ4-13	+	Band number output, 1, BCD. Note 1.
MIXED	AJ4-14	+	Band number output, 2, BCD. Note 1.
MOIST	AJ4-15	+	Band number output, 10, BCD. Note 1.
MISER	AJ4-16	+	Band number output, 20, BCD. Note 1.
DIRGE	AJ4-17	*	"Display" indicator. This line is at +5 V when the output mode is in progress, and at 0 V when integration is in progress.
LUCID	AJ4-18		Computer report-back "Finished Absorbing Data." If computers are used with the 1926, lines MAJOR and MAGIC (AJ4-42 and AJ4-44) give "busy" and "data ready" signals to tell the computer when it should not or should (respectively) read-in answers. The "data ready" signal should be thought of as a flag that is raised when an answer is to be read. This flag must be dropped as soon as the computer has read the answer lest the same answer be read again and again. Line LUCID pprovides for this resetting of the flag. The signal on LUCID must be a transition from +5 V to 0 V. Duration is not critical: 0.25 to 10 μs is OK, after which LUCID must return to +5 V
HASTE	AJ4-19		"SHIFT-TO-NEXT-CHANNEL" command. (Compare to HEATH.) This input causes the next channel to be displayed during the output phase of operation, provided the REMOTE ADVANCE button is pushed or REMOTE operation is established by grounding AJ4-20. A pulse going from +5 V to 0 V and back to +5, lasting 0.25 μs or longer is required. If channel advance is desired from "downgoing" pulses of the type just described, they must be applied to AJ4-19, whereas "upgoing" pulses will work correctly only on AJ4-45. IMPORTANT: If AJ4-19 is used for channel advance with "downgoing" pulses, contact AJ4-45 must be connected to Signal Ground, AJ4-48.
HEART	AJ4-20		Ground this line for external programming of REMOTE ADVANCE. Simultaneously enables XY PLOT, PRINTER, and CRO STORE-NO ERASE. Note that fully-remote operation as enabled by bringing HEART to ground potential will also involve signals moving back and forth on lines HASTE, HEATH, LARGE, LOYAL, and LUCID or some combination thereof. Ground to Signal Ground by contact closure or the electronic equivalent, such as a saturated transistor switch.
PLS20	AJ4-21	—	Positive 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
PLS05	AJ4-22	—	Positive 5 V, dc. This is intended as a reference voltage, and comes from the same power supply that feeds the integrated circuits in the 1926. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS05 pins on all other connectors, does not exceed 200 mA. This voltage will have many "spikes" of several tenths of a volt on it. Do not use it for anything that requires clean, well-filtered power.

Table 3-8 cont.

MIN20	AJ4-23	–	Negative 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the MIN20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
MADAM	AJ4-24	+	***Each time*** a new channel is displayed, the voltage on this line drops from +5 V to 0 V, if XY PLOT, PRINTER, or REMOTE ADVANCE buttons are pressed, or the equivalent of pressing these buttons is achieved by grounding lines RAGED, RACKS, or HEART on connector AJ2. During the time of approximately 14.5μs necessary to change from one channel to the next, the voltage on this line rises to +5.
MEDAL	AJ4-26	+	dB out, 1/4 dB, binary. Note 1.
GNDSG	AJ4-27	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
MARRY	AJ4-28	+	dB out, 1/2 dB, binary. Note 1.
GNDSG	AJ4-29	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
MOUNT	AJ4-30	+	dB out, 4 dB, BCD. Note 1.
MINCE	AJ4-31	+	dB out, 8 dB, BCD. Note 1.
MEDIA	AJ4-32	+	dB out, 40 dB, BCD. Note 1.
MERGE	AJ4-33	+	dB out, 80 dB, BCD. Note 1.
GNDSG	AJ4-34	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
MERCY	AJ4-35	+	dB out, 800 dB, BCD. Note 1.
REBEL	AJ4-36	*	***Each time*** a new channel is displayed, the voltage on this line drops from +5 V to 0 V, and remains at 0 V until the display of that channel ends. The voltage rises to +5 again during the 14.5 μs necessary to change from one channel to the next.
MODEL	AJ4-38	+	Band number output, 4, BCD. Note 1.
MINOR	AJ4-39	+	Band number output, 8, BCD. Note 1.
MISTY	AJ4-40	+	Band number output, 40, BCD. Note 1.
GNDSG	AJ4-41	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
MAJOR	AJ4-42	+	"BUSY" signal to computers. While the 1926 is processing data or changing from one output band to the next, this line is at +5 V (+15, if Board W is of the 15-V type). Positive voltage is meant to be a warning to the computer not to read-in data at this time.
MACAW	AJ4-43	+	***Each time*** a new channel is displayed, the voltage on this line rises from 0 to +5 V, if XY PLOT, PRINTER, or REMOTE ADVANCE buttons are pressed, or the equivalent of pressing these buttons is achieved by grounding lines RAGED, RACKS, or HEART on connector AJ2. During the time of approximately 14.5 μs, necessary to change from one channel to the next, the voltage on this line drops to 0.
MAGIC	AJ4-44	+	"DATA READY" signal to computer. When an answer is waiting to be read into the computer, this voltage changes from 0 to +5 (+15 if Board W is the 15-V type). This voltage acts as a flag, which must be reset by momentarily bringing the potential on line LUCID to 0 V. (see LUCID, AJ4-18).
HEATH	AJ4-45		"SHIFT-TO-NEXT-CHANNEL" Command. Positive pulse lasting 0.25 μs or longer will cause the next channel to be displayed during the output phase of operation, provided the REMOTE ADVANCE button is pushed or REMOTE operation is established by grounding AJ2-24. (Compare to HASTE.)
LARGE	AJ4-46	*	"BUSY" signal to computers. While the 1926 is processing data or changing from one output band to the next, this line is at +5 V. Positive voltage is meant to be a warning to the computer not to read-in data at this time. Line LARGE is equivalent to line MAJOR (q.v.), except that MAJOR is buffered by an output amplifier, and line LARGE comes directly from the etched board holding the control circuits. LARGE has a lower output impedance, and is more vulnerable to damage from externally-injected transients than line MAGIC.
LOYAL	AJ4-47	*	"DATA READY" signal to computer. When an answer is waiting to be read into the computer, this voltage changes from 0 to +5 V. This voltage acts as a flag, which must be reset by momentarily bringing the potential on line LUCID to 0 V. (See LUCID, AJ4-18). Line LOYAL is equivalent to line MAGIC (q.v.), except that MAGIC is buffered by an output amplifier, and line LOYAL comes directly from the etched board holding the control circuits. LOYAL has a lower output impedance, and is more vulnerable to damage from externally-injected transients than line MAGIC.
GNDSG	AJ4-48	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
PAVED	AJ4-49	–	Reference voltage equal to the supply voltage of the output buffer amplifiers on Board W. This voltage will be either +5 or +15 V, depending on whether Board W is of the 5-V or 15-V type. This is not intended as a source of power. No more than a few milliamperes should be drawn from this terminal.
GNDCH	AJ4-50	–	Chassis Ground. Makes connection to the metal case of the instrument.

Table 3-9
CONNECTOR AJ7—TO OSCILLOSCOPE (1921-P1)

LUCKY	AJ7-1	=	X-axis voltage. This voltage is always present, regardless of the settings of the OUTPUT DISPLAY buttons on the front panel.
GNDSG	AJ7-2	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
GNDCH	AJ7-3	–	Chassis Ground. Makes connection to the metal case of the instrument.
GNDCH	AJ7-4	–	Chassis Ground. Makes connection to the metal case of the instrument.
RALLY	AJ7-5	/	This is +15 V when storage is possible, 0 V when storage is prevented. Z_{out} = about 12 kΩ in the +15-V state, and about 100 Ω in the 0-V state. This line is always at +15 V, except when the OUTPUT DISPLAY, OSCILLOSCOPE, NON-STORE button is pushed. Note: there is no 5-V option.
GUEST	AJ7-6	*	This voltage goes to 0 at the moment display starts, and remains at 0 V until display ends. The voltage is at +5 during non-display times. The voltage remains at 0 all through display, including the time of about 14.5 μs while the channel just displayed is being replaced with the value for the next channel. (Compare to PADDY, equivalent signal of opposite polarity.) "Display" refers to channels actually being displayed. For example, if an instrument is designed to use channels 14-43, but only channels 20-25 are set by the LOWEST BAND NUMBER and HIGHEST BAND NUMBER switches, then line GUEST is at 0 V only while the internal circuits are working with channels 20-25.
MIN20	AJ7-7	–	Negative 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the MIN20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
GNDSG	AJ7-8	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
GNDSG	AJ7-19	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
GNDSG	AJ7-20	–	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
MOOSE	AJ4-21	$	Y-axis voltage. This voltage is always present, regardless of the settings of the OUTPUT DISPLAY buttons on the front panel.
GNDCH	AJ7-22	–	Chassis Ground. Makes connection to the metal case of the instrument.
RAINY	AJ7-23	/	Pulse to erase the stored trace on the CRO. This potential is normally +15 V (there is no 5-V option), and goes to 0 V for approximately 1/2 s to erase a stored image. Output impedance approximately 12 kΩ in the 15-V state and 100 Ω in the 0-V state.
PADDY	AJ7-24	*	Z-axis control voltage. The +5 V causes the trace to appear. This voltage goes to +5 at the moment display starts, and remains at +5 V until display ends. The voltage is 0 during non-display times. The voltage remains at +5 all through display, including the time of about 14.5 μs while the channel just displayed is being replaced with the value for the next channel. "Display" refers to channels actually being displayed. For example, if an instrument is designed to use channels 14-43, but only channels 20-25 are set by the LOWEST BAND NUMBER and HIGHEST BAND NUMBER switches, then line PADDY is at +5 V only while the internal circuits are working with channels 20-25.
PLS20	AJ7-25	–	Positive 20 V, dc. This is intended as a reference voltage. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS20 pins on all other connectors, does not exceed 20 mA. This voltage must be kept free of transients, surges, hum, etc. Do not connect anything that will impair its status as clean power.
PLS05	AJ7-26	–	Positive 5 V, dc. This is intended as a reference voltage, and comes from the same power supply that feeds the integrated circuits in the 1926. A moderate amount of current may be drawn. Be sure the current drawn from this pin, plus currents from the PLS05 pins on all other connectors, does not exceed 200 mA. This voltage will have many "spikes" of several tenths of a volt on it. Do not use it for anything that requires clean, well-filtered power.

Table 3-10
CONNECTORS FOR X-Y RECORDER

RECUR	AJ10, Center	X axis voltage to XY plotters. Voltage appears on this line only when the XY PLOT or REMOTE ADVANCE buttons are pushed. Otherwise, this line is at ground potential.
GNDSG	AJ10, Shell	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.
REFER	AJ11, Center	Y axis voltage to XY plotters. Voltage appears on this line only when the XY PLOT or REMOTE ADVANCE buttons are pushed. Otherwise, this line is at ground potential.
GNDSG	AJ11, Shell	Signal Ground. A ground to the internal circuits of the instrument, as distinguished from the metal case.

Table 3-11
CONNECTOR AJ6 CHANNEL INPUTS (TO 1925)

AJ6-01	Channel 1 input.	AJ6-17	Channel 17 input.
AJ6-02	Channel 2 input.	AJ6-18	Channel 18 input.
AJ6-03	Channel 3 input.	AJ6-19	Channel 19 input.
AJ6-04	Channel 4 input.	AJ6-20	Channel 20 input.
AJ6-05	Channel 5 input.	AJ6-21	Channel 21 input.
AJ6-06	Channel 6 input.	AJ6-22	Channel 22 input.
AJ6-07	Channel 7 input.	AJ6-23	Channel 23 input.
AJ6-08	Channel 8 input.	AJ6-24	Channel 24 input.
AJ6-09	Channel 9 input.	AJ6-25	Channel 25 input.
AJ6-10	Channel 10 input.	AJ6-26	Channel 26 input.
AJ6-11	Channel 11 input.	AJ6-27	Channel 27 input.
AJ6-12	Channel 12 input.	AJ6-28	Channel 28 input.
AJ6-13	Channel 13 input.	AJ6-29	Channel 29 input.
AJ6-14	Channel 14 input.	AJ6-30	Channel 30 input.
AJ6-15	Channel 15 input.	AJ6-31	Signal ground.
AJ6-16	Channel 16 input.	AJ6-36	Chassis ground.

Table 3-12
CONNECTOR AJ5 CHANNEL INPUTS (TO AUXILIARY 1925)

AJ5-01	Channel 16 input.	AJ5-17	Channel 32 input.
AJ5-02	Channel 17 input.	AJ5-18	Channel 33 input.
AJ5-03	Channel 18 input.	AJ5-19	Channel 34 input.
AJ5-04	Channel 19 input.	AJ5-20	Channel 35 input.
AJ5-05	Channel 20 input.	AJ5-21	Channel 36 input.
AJ5-06	Channel 21 input.	AJ5-22	Channel 37 input.
AJ5-07	Channel 22 input.	AJ5-23	Channel 38 input.
AJ5-08	Channel 23 input.	AJ5-24	Channel 39 input.
AJ5-09	Channel 24 input.	AJ5-25	Channel 40 input.
AJ5-10	Channel 25 input.	AJ5-26	Channel 41 input.
AJ5-11	Channel 26 input.	AJ5-27	Channel 42 input.
AJ5-12	Channel 27 input.	AJ5-28	Channel 43 input.
AJ5-13	Channel 28 input.	AJ5-29	Channel 44 input.
AJ5-14	Channel 29 input.	AJ5-30	Channel 45 input.
AJ5-15	Channel 30 input.	AJ5-31	Signal ground.
AJ5-16	Channel 31 input.	AJ5-36	Chassis ground.

Theory–Section 4

4.1 GENERAL 4-1
4.2 DETAILED THEORY 4-3
4.3 DIGITAL DATA-PROCESSING 4-4
4.4 DATA-PROCESSING-BOARD FUNCTIONS 4-8

4.1 GENERAL.

4.1.1 Detector.

The 1926 Multichannel RMS Detector computes simultaneously the true rms level for up to 45 separate input channels. A block diagram is shown in Figure 4-1.

Up to 1024 samples are taken of each input. Each sample is converted to a digital word and is squared. The squared values of each sample are accumulated in a memory register where spaces are provided separately for each input channel. At the end of an integration period, the memory register holds the sum-of-squares value, which is later converted to decibels for output presentation of the corresponding true rms value.

The above describes the operations that take place during a single integration or measurement period, which is adjustable in nine octave steps ranging from 1/8 to 32 s. For integration periods of 1 s and longer, 1024 samples are taken. For shorter integration periods the number of samples is proportionately reduced, with a minimum of 128 samples being used for a 1/8-s integration.

The frequency of sampling is different for each integration period (1 s and longer) and is lower than most input signals within its operating range of 2 Hz to 100 kHz. Uniformly spaced samples would be coherent with many values of input frequency. To avoid coherence with input signals, the time space between samples is linearly modulated.

The rate of sampling is well below the Nyquist rate for most input frequencies. Because we are not attempting to reconstruct signals, however, this is of no consequence. Rms measurements can be accurately made at a low sampling rate in the absence of coherence.

At the end of an integration period, the sum-of-squares value is converted to decibels for output presentation. Levels are computed within 15 μs per channel, and all channel levels can be presented in less than 1 ms.

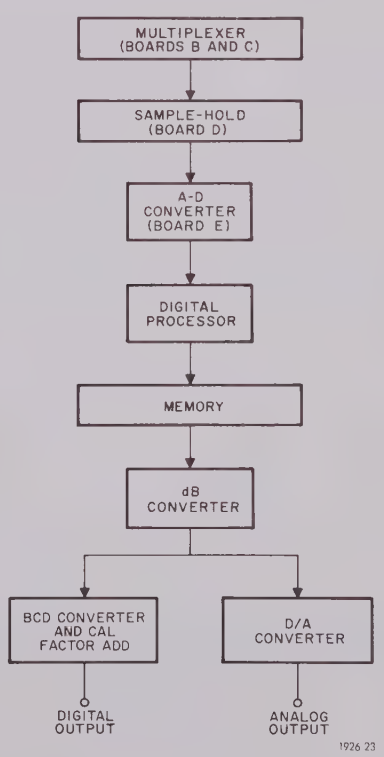


Figure 4-1. Block diagram of the 1926 Multichannel RMS Detector.

Output data are simultaneously presented in digital (with BCD format) and analog forms, plus a front-panel Nixie-tube readout. Control signals and format are designed to interface the output with a digital computer, printer, oscilloscope, or XY plotter.

A scale-factor adder is provided to adjust the output-level readings when the 1926 is used as a system component. Normally, a 1-V, rms, input produces an output-level reading of 60 dB. This reading is adjustable in 1-dB steps to a maximum of 159 dB. This adjustment has no effect on the *analog* output levels.

Band numbers are displayed with each output level, and correspond to the American National Standard Band Numbers (formerly USA Standard Band Numbers") for 1/3-octave filters (ANS1.6-1969). The number of channels to be displayed is controlled by the LOWEST BAND NUMBER and HIGHEST BAND NUMBER control settings.

Two extra internal channels are included, to calibrate 0 and full scale on the 1926. They are measured during each integration period and can, therefore, be used to continuously monitor calibration, if so desired. The calibration channels are also intended to be used to set up analog output equipment, such as an XY recorder or oscilloscope.

4.1.2 Principles of RMS Measurement.

A voltage wave, v(t), has a mean value $\bar{v}(t)$

$$\bar{v}(t) = \frac{1}{T}\int_0^T vt\,dt \qquad (1)$$

The mean square value of v(t), taken about its mean, is called the variance, σ^2

$$\sigma^2 = \frac{1}{T}\int_0^T [v(t) - \bar{v}(t)]^2\,dt \qquad (2)$$

The square root of σ^2 is called the root-mean-square, or rms, value of v(t). (Note that σ^2 excludes dc).

If we assume that $\bar{v}(t) = 0$, equation (2) reduces to

$$\sigma^2 = \frac{1}{T}\int_0^T [v(t)]^2\,dt \qquad (3)$$

and the rms value becomes

$$\sigma = \sqrt{\frac{1}{T}\int_0^T [v(t)]^2\,dt} \qquad (4)$$

When the data are discrete, the voltage v(t) is known only at discrete instants of time, t. The integral of equation (4) reduces to a summation and we have

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N} [v(t_i)]^2} \qquad (5)$$

where N = number of samples.

The rms value, therefore, is equal to the square root of the sum of the squares of v (t_i) divided by the number of samples.

The 1926 Detector measures the values $v(t_i)$ with a 1-mV reference level. The rms level in decibels above 1 mV is, therefore,

$$\begin{aligned} \text{rms} &= 20 \log_{10}\left(\frac{\sigma}{\sigma_0}\right) \text{dB} \\ &= 10 \log_{10}\left(\frac{\sigma}{\sigma_0}\right)^2 \text{dB} \end{aligned} \qquad (6)$$

where σ_0 is the mean value at the reference level. Combining equations (5) and (6),

$$\text{rms} = 10 \log_{10} \left\{ \frac{1}{N} \sum_{i=1}^{N} \left[\frac{v(t_i)}{v_0}\right]^2 \right\} \text{dB} \qquad (7)$$

where V_0 is the voltage at the reference level.

Equation (7) is computed by the 1926, and avoids the square-root operation by using 10 $\log_{10}$. As a further simplification, N is always a binary number, so that division by N is simply a binary point shift.

4.1.3 Crest Factor.

Crest factor is defined as the voltage ratio between the peak and rms levels of a wave. In reality, crest factor is an artifice that was invented to specify the limitations of quasi-rms detectors. There are no crest-factor limitations with the 1926 for signals that are within its input dynamic range of 70 dB.

4.1.4 Decibel Conversion.

All output measurements of the 1926 are in decibel units. During the output phase of operation, the digital memory has in storage the mean-square measurement values (called the variance, σ^2), which are converted to rms in dB using the operations described by equation (6).

$$\text{rms} = 10 \log_{10}\left(\frac{\sigma}{\sigma_0}\right)^2 \text{dB}$$

The memory format is floating-point binary, so that σ^2 is a number stored in two parts: a mantissa, m, and a binary exponent, E;

$$\sigma^2 = m \cdot 2^E \qquad (8)$$

Substituting (8) into (6),

$$\begin{aligned} \text{rms} &= 10 \log_{10} m + 10E \log_{10} 2 \text{ dB} - 10 \log_{10} \sigma_0 \\ &= 10 \log_{10} m + 3.01E \text{ dB} - 10 \log_{10} \sigma_0 \end{aligned} \qquad (9)$$

The ($10 \log_{10} m$) term of equation (9) is a component that lies between 0 and 3 dB, because m is a number that lies between 1.0 and 2.0. The second half of equation (9) is a component that lies between 0 and 60.2 dB, because E is

an integer number that lies between 0 and 20. The third term is a constant that accounts for the reference level.

The output data is quantized in 0.25-dB steps, making a total of 240 possible output steps for the dynamic range of 60 dB. Between 0 and 3 dB there are 12 steps (the possible outcomes of the output computation using the mantissa, m). For outputs between 3 and 6 dB, the exponent E equals 1 and again 12 steps are needed. This process repeats up to a maximum of 60 dB, where E=20 (actually for 60.2 dB). Using 12 steps for the mantissa and 20 for the exponent, therefore, a total of 240 steps are possible (12 times 20), using a very simple computational algorithm.

The (3.01E) term of equation (9) is not a whole number. In the actual computation, this fractional difference is not ignored.

Computation of the first half of equation (9) is achievec with a fixed conversion matrix. It accepts a 5-bit input (32 possible inputs) and has 13 possible outputs (12 steps plus 0).

4.2 DETAILED THEORY.

4.2.1 Multiplexer, (Figures 6-4 and 6-6).

The Multiplexer is an electronic switch with up to 45 inputs and one output. It occupies two separate printed-circuit boards, one with 30 channels (board C) and the second with 15 channels (board B). The 30-channel board also has the two calibrate channels at 0 and full-scale levels.

Signal inputs are capacitor coupled to remove any dc signal component and have a low cutoff frequency (below 1 Hz).

The channels are switched on in sequence by command from the system control, using 14 lines. The control lines are arranged in an 8-by-6 matrix, and one line from each group must be true to address a channel.

Calibration of 0 is achieved with a grounded input channel and full scale is calibrated from a precision dc voltage of 1.056 V. (This odd value is necessary because of input quantization.)

4.2.2 Sample-Hold (Figures 6-8, -9, -10).

The sample-hold circuit (board D) takes two samples of its input simultaneously (see Figure 4-2). The input passes through a unity-gain buffer for one sample and through a 35-dB amplifier for the second sample. The sample gate is active for 1 μs and has a charging time constant of 0.1 μs.

One μs after the samples are taken, a decision is made to select the one sample that is within the linear operating range. Also, at this time the sample polarity is sensed and a decision is made to use an inverting amplifier, if necessary, to make the sample-hold output positive. A final gain of 2 is added at the output, to drive the A-D converter circuit that follows.

Coarse-range information is derived from the decision as to which of two samples is selected. This information is utilized by the A-D converter and the squarer.

Amplifiers in the sample-hold circuit use discrete components and have a differential or balanced configuration. A potentiometer is used to adjust the dc balance, but the gains are fixed and are controlled by 0.1% precision resistors.

4.2.3 A-D Converter (Figures 6-12, -13, -14).

The A-D converter (board E) uses floating-point binary arithmetic to achieve a constant-percentage accuracy. The binary point is located by octave-level ranging, with up to 7 possible range positions. Each range is resolved with a 3-significant-bit (8 steps) digital conversion. The complete input conversion includes a coarse-range decision and a full-wave rectification (absolute-value circuit), which is performed by the sample-hold circuit (see Figure 4-3).

After the coarse-range decision of Hi or Lo has been made, the A-D converter searches through either 7 or 3 fine ranges, respectively. The fine-range search begins at the highest possible level and looks at successively lower levels until the binary point is located. Next, a comparison is made between the amplified input and a D-A converter, to resolve the selected fine-range level with a 3-bit resolution.

The D-A converter actually has 5 bit positions. The most significant is used as a reference for fine-range decisions.

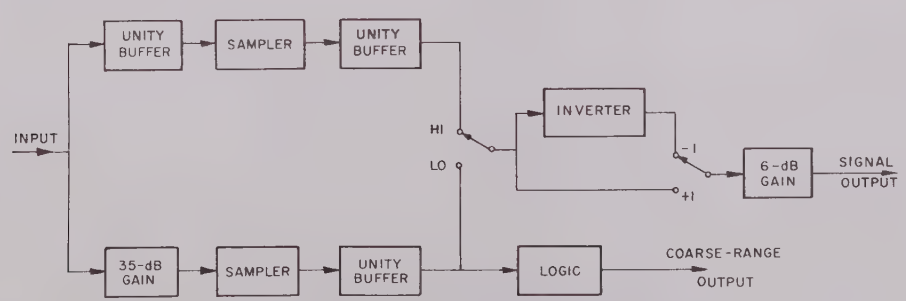


Figure 4-2. Block diagram of the sample-hold circuit.

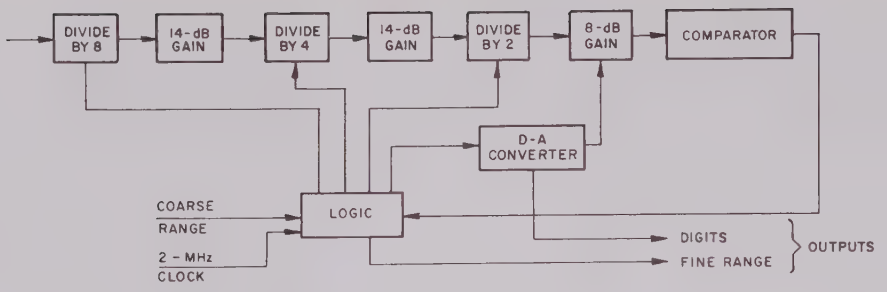


Figure 4-3. Block diagram of the A-D Converter.

The next three are used to resolve a selected range (called "digiting"). The fifth bit is used for digiting, to center the quantization errors and make them round-off errors.

Decisions are made at a rate of one per microsecond. The first half of each microsecond block is reserved for transients to settle and decisions are inhibited during this time.

Amplifiers in the A-D circuit use discrete components and have a differential or balanced configuration. A potentiometer is used to adjust the dc balance, but the gains are fixed and controlled by 0.1% precision resistors.

4.2.4 Squarer (Figure 6-16).

The squarer circuit (board G) accepts binary inputs from the sample-hold circuit and the A-D converter, to generate the squared value of each input sample. Its output is in a floating-point format that is consistent with the arithmetic of the computer.

The computer accumulates the sum of squares using a 15-bit floating-point word with a 5-bit exponent.

At most, five consecutive bit positions are occupied at the squarer output, and the placement of these five within the 15-bit word depends upon the input-sample magnitude. Furthermore, the pattern of 5-bit squares repeats within all but the lowest fine-range positions. Taking advantage of these facts, the squarer first generates the appropriate 5-bit pattern and then shifts it to its proper position within the 15-bit output word. A further simplification of the squarer operation is a result of the relative position of the coarse-range threshold. For a Hi decision on coarse-range (large input signals), the uppermost 5-bit positions are occupied at the squarer output. No shifting is required for this condition, but an exponent is. The squared exponent value is generated from fine-range information. Because no exponent is required when the coarse range is Lo, the exponent output is inhibited by the coarse range.

The most significant bit of fine-range data is also part of the squares exponent, but can only be true when coarse range is Hi. This line is not processed by the squarer but is passed directly to the processor input.

4.3 DIGITAL DATA-PROCESSING.

4.3.1 General.

The data-processing action of the instrument will be discussed in two parts: the development of the mean-squared value, and the presentation of the answer in decibels. The first of these functions occurs during the RUN or INTEGRATE mode; the second occurs during the OUTPUT mode.

The general principles will be explained first. Certain specific functions will then be described in more detail.

4.3.2 INTEGRATE Mode.

Figure 4-4 shows the flow of data during the INTEGRATE mode. The squared numbers are delivered to the accumulator in two parts: a mantissa and an exponent. Simultaneously, the number is taken into the memory buffer as a mantissa and an exponent. The two exponents are compared. Since only the accumulator has provisions for shifting digits, the number with the smaller exponent must be in the accumulator. If a swap is necessary to get the number with the smaller exponent into the accumulator, a swap is made.

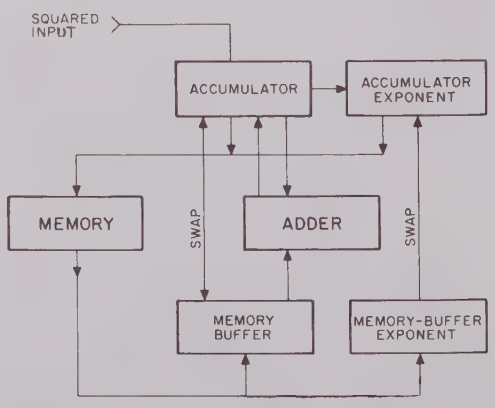


Figure 4-4. Integrate-mode data flow.

Next the exponents are made equal. The accumulator bits are shifted one place to the right, and the accumulator exponent is increased in value by one digit. Note that shifting the accumulator (i.e., mantissa) bits one place to the right has the effect of cutting the value of the quantity in the accumulator in half. This will introduce an error unless the number is then doubled to restore its original value, which is just what is done when the accumulator exponent is made one digit larger.

The exponents are compared again between the accumulator and the memory buffer. If the accumulator exponent is not yet as large as the memory buffer exponent, the shift and increment processes are repeated in the accumulator. Eventually, the exponents match.

Once the exponents in the accumulator and memory buffer are equal, the digits in corresponding stages of the mantissas have the same weight, and they may then be added. What we have done is equivalent to the following example:

$$\begin{array}{r} 629 \times 10^{1} \\ 225 \times 10^{2} \\ \hline 854 \times 10^{?} \end{array}$$

NO! This is wrong and meaningless.

Instead,

$$\begin{array}{r} 62.9 \times 10^{2} \\ 225 \quad \times 10^{2} \\ \hline 287.9 \times 10^{2} \end{array}$$

YES! The exponents are the same and addition is permissible.

Of course, the electronic stages work in binary rather than decimal.

The output of the adder is returned to the accumulator for one last check. Since the capacity of the instrument to store and process numbers is limited by the quantity of flip-flops, shift-registers, etc., care must be taken to prevent getting a number in one location that is too large to fit in other places. If the result of the addition involves a carry, so that the accumulator contains 16 rather than 15 bits, then the mantissa must be cut back to size. This is done by merely shifting the mantissa one place to the right and increasing the exponent by one digit again. Therefore, if there is a carry to 16 places, one more shift and add will be needed. If there is no carry, the accumulator is finished with its work on this particular squared input number.

The contents of the accumulator and accumulator exponent are put back into memory. Another squared number is presented to the accumulator, and the whole process repeats.

The timing sequence of these steps is shown in Figure 4-5. At time T1, the first of 30 half-microsecond intervals, data is read into the accumulator and memory buffer. Swapping takes place during T2, if it is required at all. Then follows a long interval, T3, during which time clock pulses are applied to the accumulator until the exponents match. If more than 15 clock pulses are applied, there will be only zeros in the accumulator. In theory, up to 23 shifts could be required. In practice, if any exponent gets this large, the

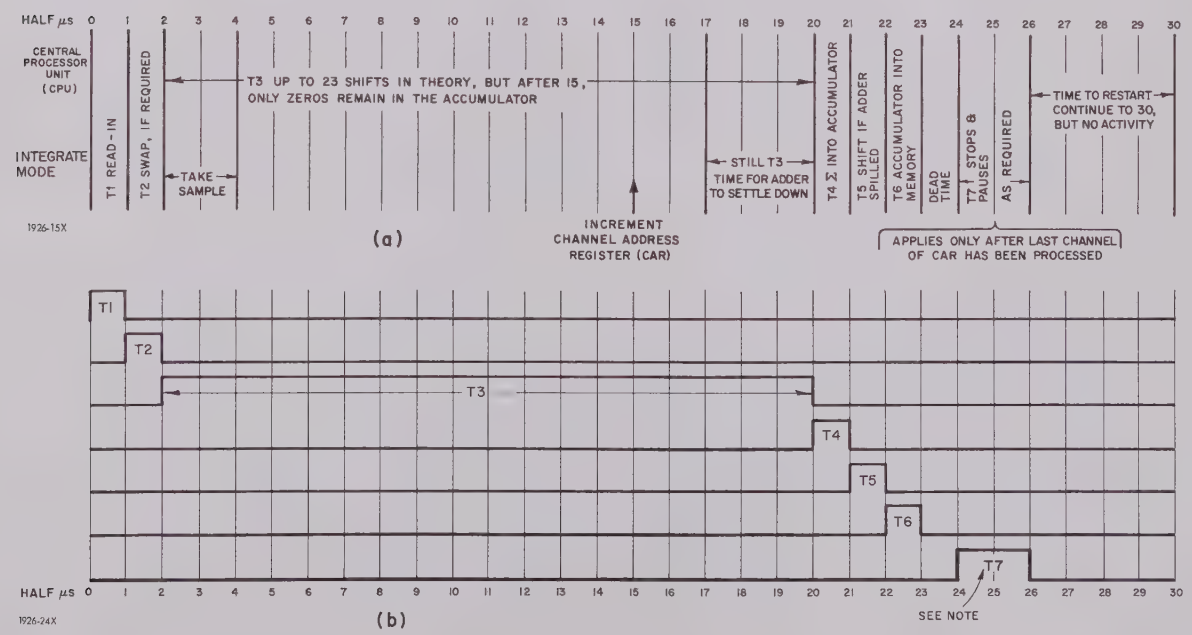

HALF μs 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
CENTRAL PROCESSOR UNIT (CPU)
INTEGRATE MODE
T1 READ-IN
T2 SWAP, IF REQUIRED
TAKE SAMPLE
T3 UP TO 23 SHIFTS IN THEORY, BUT AFTER 15, ONLY ZEROS REMAIN IN THE ACCUMULATOR
STILL T3 TIME FOR ADDER TO SETTLE DOWN
T4 Σ INTO ACCUMULATOR
T5 SHIFT IF ADDER SPILLED
T6 ACCUMULATOR INTO MEMORY
DEAD TIME
T7 STOPS & PAUSES AS REQUIRED
TIME TO RESTART CONTINUE TO 30, BUT NO ACTIVITY
1926-15X
(a)
INCREMENT CHANNEL ADDRESS REGISTER (CAR)
APPLIES ONLY AFTER LAST CHANNEL OF CAR HAS BEEN PROCESSED
T1
T2
T3
T4
T5
T6
T7
HALF μs 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
1926-24X
(b)
SEE NOTE

Figure 4-5, (a). Timing diagram for the integrate-mode data flow.
(b). Waveforms at points on board M where timing signals occur during the integrate mode. Waveforms are idealized and do not show rise times or the small noise spikes normally present.

output circuits will interpret it as an overload condition and refuse to give the exact value anyway, so there is no need to provide for the maximum possible number of shifts.

At time T4, the sum at the adder outputs is transferred to the accumulator. If a carry has occurred during the addition, so that the mantissa attempts to become 16 bits long, this fact is sensed during time T4. At T5, if the mantissa is 16 bits in length, the accumulator is shifted one place to reduce the mantissa back to 15 bits, and the exponent is increased by 1. If the mantissa was not 16 bits, nothing happens at T5. At T6, the accumulator contents are returned to the memory. The remaining time of the 30 half-microseconds allowed for each processing sequence is "spare."

NOTE

During T7, progressive delays occur to modulate the sampling rate. The pulse at T7 becomes longer each time the last channel in a given sequence has been processed.

4.3.3 OUTPUT Mode.

The OUTPUT mode begins when all data gathering is completed. Figure 4-6 shows the sequence of data flow.

In the first step, the stored sum-of-the-squares is drawn out of the memory into the memory buffer. This number is fed to a block marked OUTPUT CORRECTION. If the time of integration was less than 1 s, the sum of the squares is a smaller number than if the time had been 1 s or longer. This is because as the time is reduced below 1 s, fewer samples are taken. For example, if the time is ¼ s, only 256 (instead of 1024) samples are taken. The sum of the squares will be one fourth as large as it should be. The OUTPUT CORRECTION block (on board S) multiplies the sum of the squares by 2, 4, or 8 if the integration time is 1/2, 1/4, or 1/8 s, respectively.

The numbers derived from the mantissa of the sum of the squares give a contribution to the final answer of between 0 and 3 dB. This contribution is determined in the 0-to-3-dB block. The numbers derived from the exponent of the sum of the squares must be multiplied by 3.01.

The circuits in the MEMORY BUFFER and the MEMORY BUFFER EXPONENT blocks are clocked JK flip-flops. They can be accepting new data into storage as the previously held data is read out. The next step in the output sequence takes advantage of this fact; the sum of the squares, in binary, is delivered back to the memory for future use at the same moment that the result of the (0 to 3 dB) determination is fed into the memory buffer. Simultaneously, the (EXP x 3.01) result is deposited into the accumulator.

The accumulator and memory buffer are both connected to the adder, which gives the sum of the (0 to 3 dB) and the (EXP x 3.01) contributions. The adder output is the binary representation, in dB, of the sum of the squares for the channel that was just taken from, and returned to, memory. Note that the square root is never taken explicitly; the conversion is directly from the sum of the squares into dB. The adder output is then transferred to the accumulator. The accumulator now contains the dB's in binary form. This result is converted to binary-coded decimal (BCD) in 1-2-4-8 format. If the front-panel MAX BAND LEVEL switch calls for the range of answers to be other than the usual 0 to 60 dB (e.g., 20 to 80 dB), an appropriate constant number of dB is added at this time.

These output conversions are performed on board T, except the D-A (digital-to-analog) conversion, which, together with the buffer amplifiers, is on board W.

The final output consists of (1) BCD representation of the dB's calculated from the sum of the squares plus the calibration factor, if any, added by the MAX LEVEL switches and (2) an analog voltage proportional to the number of dB, ***not including*** the calibration factor.

If the exponent in the sum of the squares is 20 (binary 10100) or larger, the instrument concludes that an overload condition existed in the input signal. Board T senses this fact and causes the answer to be reported as 800-some dB's. Answers greater than 60 dB will fall in this category. (It is possible that an answer between 60.25 dB and 63 dB could be a valid answer, but this cannot be determined from the front panel display.)

Figure 4-7 shows the timing sequence of the output operation. In order to simplify the central processor control circuits, the times are kept the same as in Figure 4-5. However, the functions at each time differ greatly.

At time T1, the sum of the squares is read into the memory buffer and memory-buffer exponent. During time T2, the log-computing operation takes place. The high speed at which this occurs is possible because a pattern-recognition process is employed rather than the computation of an algebraic series, as would be done by a general-purpose computer.

Time T3 is largely wasted time during the OUTPUT mode. (This time must be long during the RUN mode so that exponents can be justified by as many shifts as necessary in the accumulator.) The adder has ample time for the transients and the carries to settle down. The result of the addition is dB in binary. This is transferred to the accumulator at time T4. During time T5, the binary is converted to BCD. At the end of T5, the BCD numbers are transferred into storage registers, where they are held until moment T5 of the next channel's turn to be displayed.

Time T6 differs from other times on Figure 4-7 because it may last an appreciable fraction of a second, depending on the requirements of the output-display equipment that is in operation. An oscilloscope is given about 1 ms per channel; printers and XY plotters have times on the order of a half second per channel; for visual readout of the Nixie tubes, as much as 1 s is available for each channel.

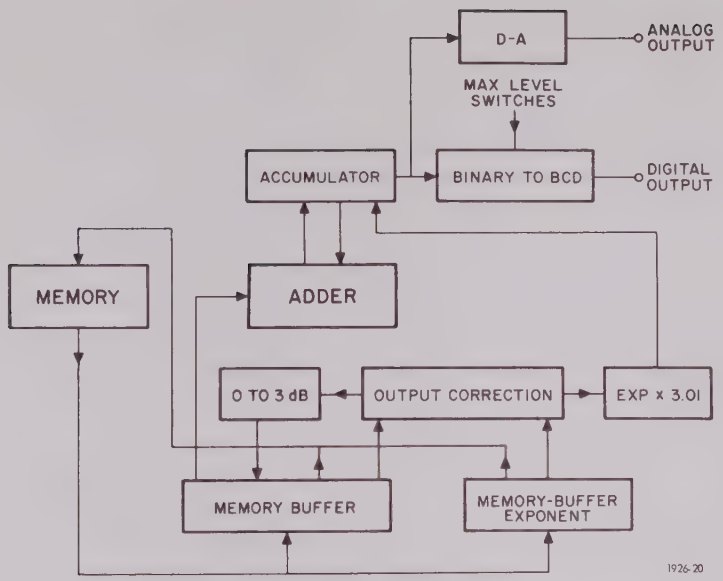


Figure 4-6. Output-mode data flow.

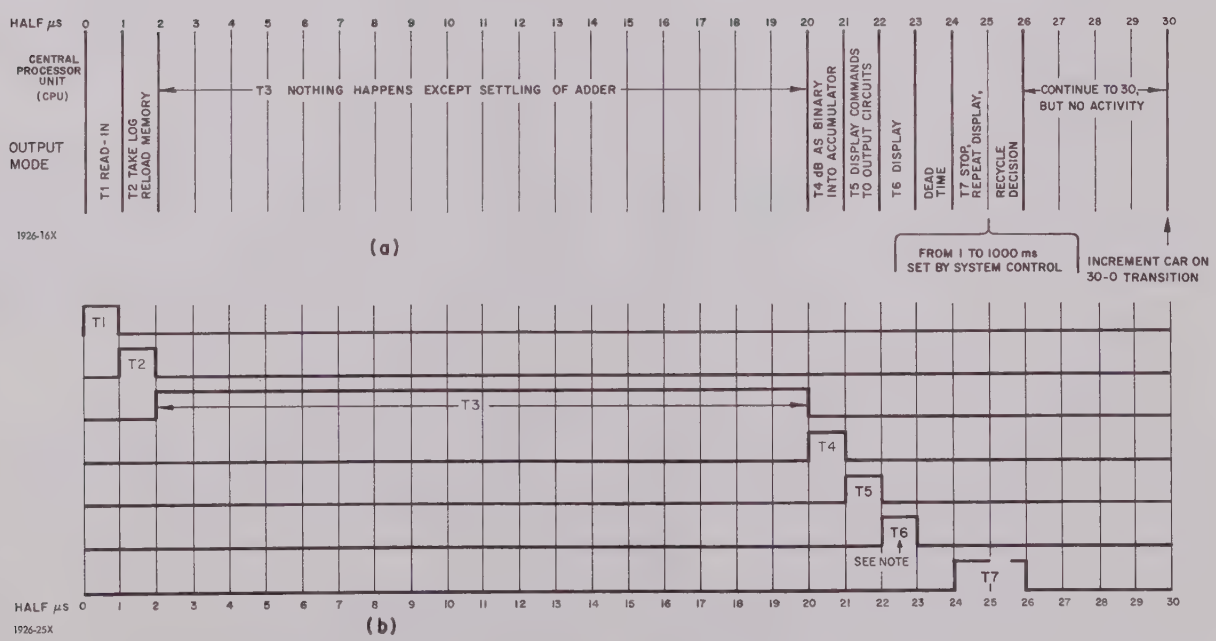


Figure 4-7, (a). Timing diagram for the output-mode data flow.
(b). Waveforms at points on board M where timing signals occur during the display mode. Waveforms are idealized and do not show rise times or the small noise spikes that are normally present.

NOTE

Time T6 is when the display actually occurs and may be any length from a few microseconds if the results are transferred to a computer, up to many minutes when manual advance of the output is used. The sketch shows this time as 0.5 μs, the shortest possible time.

At time T7, if the *last channel* has just been displayed, a decision is made as to whether the instrument will stop, or repeat the display of data that has just been completed, or perform a brand new measurement of rms values and then display those results. If the answer just displayed is *not* the last channel, nothing happens in time T7.

4.4 DATA-PROCESSING-BOARD FUNCTIONS.

4.4.1 General.

The functions of each of the etched-circuit boards will be described in the following paragraphs. Boards are listed in the order in which they occur in the instrument, starting just behind the front panel. (See Figure 4-8 for locations of boards in the instrument.)

4.4.2 Display Panel Board (Figure 6-46).

Board U contains the Nixie tubes for displaying the band number and the answer in decibels. The front-panel thumbwheel switches use board U for a terminal strip. Board U contains the integrated circuits for decoding band numbers and decibels expressed in binary-coded-decimals (BCD) into ten-line information for the Nixie tubes. It contains integrated-circuit inverters for converting some of the thumbwheel voltages into the correct polarity for operating internal circuits. It includes transistor circuits for turning the Nixies on and off during times when integration is in progress.

4.4.3 Output Decoder (Figure 6-41).

Board T turns internally generated answers in decibels into a displayable form. It converts the BCD commands from the front-panel MAXIMUM LEVEL DB switch into conventional binary, which it adds to the number of decibels (also in binary) that correspond to the answer for each band as it is displayed. The grand total in binary is then decoded back to BCD for display by the Nixies and any external devices such as punches, printers, etc. that work from BCD numbers. Board T recognizes if an "overloaded" answer is present. If so, it adds jitter to the display of analog devices so that overloaded bands can be recognized by their fuzzy traces on oscilloscopes or XY plotters. It changes the digital answers to numbers of 800+ or 900+, to identify overloads digitally.

4.4.4 Log Converter (Figures 6-24, -25).

Board S performs several functions, all related to preparing data for output:

First, when integration time is less than one second, corrections are made to simulate the sum of squares that would have been built up in the memory banks if integration had proceeded for 1 s or more.

Second, the mantissa of the sum of the squares is converted to the "vernier" contribution to the answer in decibels, a value between 0 and 3 dB, to the nearest 1/8 dB.

Third, Board S converts the exponent in the sum of the squares into the major part of the answer in decibels. This contribution is 3.01 times the size of the exponent, rounded off to the nearest 1/8 dB.

Finally, if an exponent is too large, indicating an overload, board S changes its value to a number large enough to be recognized as an overload by board T, and small enough not to fall outside the range of decoding circuits on board T.

4.4.5 Slice 1 and Slice 2 (Figures 6-18 and 6-20).

These two boards, H and J, are called "slice" boards because each contains a "slice" of memory buffer, accumulator, memory, adder, and miscellaneous control functions. These boards work on the mantissa of the number representing the sum of the squares during integration time. During output time, they act as temporary storage for the contributions to the answer made by the mantissa and the exponent (these contributions originate on board S), and add these contributions to obtain the total answer in decibels.

4.4.6 Slice 3 (Figure 6-22).

Board K is called "Slice 3." It is the third board containing a slice of memory, accumulator, adder, etc. However, this board is devoted wholly to the exponent. On this board, comparisons are made to determine whether shifting is required to justify the exponents before addition (refer to paragraph 4.3).

4.4.7 Squarer (Figure 6-16).

Board G is the squarer board, mentioned at this point only to keep the sequence true, as we list boards from front to back. The action of this board has been described in paragraph 4.2.4.

4.4.8 CPU Control (Figure 6-27).

Board L is involved chiefly with control of the OUTPUT phase of operation. It generates the relatively slow clock pulses that control the operation of the instrument during integration times of 1/8 to 32 s. During the OUTPUT cycle, it provides the command signals to control the action of

oscilloscopes, XY plotters and printers. It generates the control signals for the GR Type 1522 DC Recorder. This board recognizes whether the measurement mode is SINGLE, SINGLE-HOLD, or MULTIPLE, and it generates appropriate control pulses at the end of each sequence of data output display. It generates the control pulses to advance the display from one band to the next, whether this advance is ordered by an external electrical signal, by internal timing circuits, or by a push of the MANUAL ADVANCE button.

4.4.9 Sweep Generator (Figure 6-29).

Board LS is the small board attached to board L. It generates the X-axis sweep voltages for oscilloscopes and plotters.

4.4.10 Time Code Generator (Figures 6-31, 32).

Board M is the primary system control board during INTEGRATION times. This board contains the time-code generator that recognizes time intervals T1 through T7 (refer to paragraphs 4.3.2 and 4.3.3). It contains the circuits that recognize these times and cause appropriate actions to be taken on the "slice" boards, H, J, and K. Board M generates the pulses that start the instrument at the beginning of an integration. This board contains the flip-flop whose state specifies the existence of the INTEGRATE or OUTPUT condition of operation.

4.4.11 Modulated Oscillator and Counter (Figure 6-34).

Board N generates a variation in sampling times (wobulation) from one sample to the next, to eliminate the danger of the sampling moments being coherent with an input waveform. Board N also delivers signals to board M for termination of the INTEGRATION mode. It generates a signal that causes old memory data to be erased during the first sampling cycle of a new integration. It also recognizes when 64, 128, 256, 512, and 1024 samples have been taken. This information is needed to determine when to stop integration, if a measurement is made for less than 1 s. This board is used only in the INTEGRATE mode.

4.4.12 Channel Address Register (Figures 6-36, -37).

Board P controls the channel addressing within the instrument. It contains the CHANNEL ADDRESS REGISTER (CAR)-a six-stage counter that is used to address channels in the OUTPUT mode and to generate "WAIT FOR WOBULATION" pulses in the INTEGRATE mode. It determines which multiplexer channel is connected to the sample-hold circuits during integration times. It determines what band number is assigned to each answer during the OUTPUT phase of operation, and it contains a recognition circuit that signals the end of the OUTPUT mode.

4.4.13 Channel Display Recognition (Figure 6-39).

Board Q functions during the OUTPUT operations. It compares the band number generated on board P with the settings of the LOWEST BAND NUMBER and HIGHEST BAND NUMBER controls on the front panel. When the LOWEST BAND NUMBER matches the signal from Board P, output time interval T6 changes from 0.5 μs to a longer length of time suitable for whatever display devices are used. When the HIGHEST BAND NUMBER matches the band number signal from Board P, time T6 is reduced to 0.5 μs again and unwanted bands are whisked by at the speed of 15 μs each.

4.4.14 Output Buffer and D-A Converter (Figures 6-43, -44).

Board W contains buffer amplifiers to isolate internal signals from the external terminals where the band numbers and decibel levels are available as voltages in binary-coded decimal form. Board W is available in two versions: one has output voltages that swing between nominal levels of +15 and 0 V; the other has nominal levels of +5 and 0 V. The high-voltage version uses Type 9116 Integrated Circuits with 12-kΩ output impedances. The low-voltage version uses Type 9112 integrated circuits, with a low, non-linear output impedance typical of TTL integrated circuits.

Board W generates the voltage that represents the decibel level in analog form, for use with oscilloscopes and XY plotters. In response to signals from Board T, board W also generates the jitter that identifies an overloaded signal by presenting a fuzzy trace.

Service and Maintenance—Section 5

5.1 GR FIELD SERVICE 5-1
5.2 MINIMUM PERFORMANCE STANDARDS 5-2
5.3 ADJUSTMENTS 5-4
5.4 TROUBLE ANALYSIS 5-4
5.5 KNOB REMOVAL 5-9
5.6 KNOB INSTALLATION 5-9

CAUTION

Servicing of the 1926 beyond the board level is not recommended. This is especially true of the digital section, which, because of its complexity, is extremely difficult to trouble-shoot (without the use of a logic-circuit analyzer, such as the GR Type 1790). Trouble analysis in the analog section (boards B, C, D, and E) is not recommended because of the high component density and the possibility of creating additional damage.

5.1 GR FIELD SERVICE.

The two-year warranty stated attests the quality of materials and workmanship in our products. When difficulties do occur, our service engineers will assist in any way possible. If the difficulty cannot be eliminated by use of the following service instructions, please contact our Service Department, giving full information of the trouble and of steps taken to remedy it. Be sure to mention the type, ID, and serial numbers of the instrument.

Before returning an instrument to General Radio for service, please contact our Service Department, or nearest District Office, requesting a "Returned Material" number. Use of this number will ensure proper handling and identification. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay.

5.2 MINIMUM PERFORMANCE STANDARDS.

5.2.1 General.

The following tests should be performed for incoming inspection or periodic operational checking of the 1926. The equipment required is listed in Table 5-1. Follow the procedures in the order given.

NOTE

If a Detector is received as part of the 1921 Real-Time Analyzer, the procedures given in the Instruction Manual for the 1925 Multifilter should be followed first, to determine whether the Multifilter or the Detector is at fault, if trouble is indicated.

5.2.2 Operational Checks.

a. Set the power slide switch (5, Figure 1-2, on the rear panel) to the value of line voltage being used (100-120 or 200-240 V). Set the CHASSIS CONNECTED TO CIRCUIT GROUND slide switch to DIRECT. Connect the line power to the instrument; use the 3-terminal power cord (supplied). Turn ON the POWER switch on the front panel. The power light (upper center of front panel) should glow.

b. Press the PANEL DISPLAY button (in). The BAND LEVEL dB lamps should flash.

TABLE 5-1
Required Test Equipment

EQUIPMENT	REQUIREMENTS	RECOMMENDED
Oscillator	Frequency Range: range of 1926 Calibration Accuracy: ±2%	GR 1310-C Unit Oscillator
Attenuator	Range: 0-50 dB in 1-dB steps Accuracy: ±0.5%	GR 1450-TB Decade Attenuator or equivalent.
Counter	2 MHz	GR 1192 Counter.
Voltmeter	True RMS Accuracy: ±2% Range: 0-2 V	Ballantine, Model 323-01 or equivalent.
Digital Voltmeter	Accuracy: ±2% Range: 0-5 V	Dana, Model 5500 Digital Voltmeter.
AC/DC Voltmeter (or VTVM)	Range: 1.5-300 V Accuracy: ±2% of indicated reading Input impedance: 20,000 Ω/V	GR 1806 Electronic Voltmeter.
Oscilloscope	Bandwidth: dc to 4 MHz Time base: 1 ms/div - 0.1 s/div.	Tektronix, Model 310A, or equivalent
Autotransformer, metered, adjustable	Output: 140 V, 100 W Meter: ac ±3% accuracy	GR W5MT3W Variac
Resistor	400 Ω ± 5%	———
Resistor	200 Ω ± 5%	———
Stop Watch	To read 0-32 seconds	———
Switching Assembly	(Refer to paragraph 5.4.4 and Figure 5-4.)	———

c. Set the controls on the 1926 as follows:

PANEL DISPLAY.....in
INTEGRATION TIME.....1/8 s
MEASUREMENT MODE.....MULTIPLE
OUTPUT DISPLAY..... PRINTER
DISPLAY RATE.....64
MAXIMUM BAND LEVEL dB (MBL).....60
LOWEST BAND NUMBER (LBN) and
HIGHEST BAND NUMBER (HBN).....
.....The two channels below the first active channel (refer to paragraph 3.2.2).

Push the START button. Indications should be as follows:

BAND LEVEL dB.....60.00 (flashing)
Integration light.....flashing
BAND NUMBER.....blank

d. Press each INTEGRATION TIME button in turn (1/8, 1/4, 1/2, etc.). The BAND LEVEL indication should remain 60.00, but the rate of flashing should gradually decrease.

e. Set:

INTEGRATION TIME.....1 s
MEASUREMENT MODE.....SINGLE-HOLD

Press the START button. The BAND LEVEL should read 60.00 dB and remain lighted (not flashing).

f. Change the INTEGRATION TIME at 1/8 s. Do ***not*** press START button. BAND LEVEL should now indicate in 800's (e.g., 861.00).

g. Set the INTEGRATION TIME to ~~1/2 s.~~ 1/8 Push START button. The BAND LEVEL should again indicate 60.00 dB. Change the INTEGRATION TIME to 1/4 s, 1/2 s, 1 s in turn. Corresponding BAND LEVELS should be

1/4 s.....57.00 dB
1/2 s.....54.00 dB
1 s.....51.00 dB

h. Push the START button. BAND LEVEL should again be 60.00 dB. Increase the MAXIMUM BAND LEVEL reading by 1-dB increments. The BAND LEVEL dB indication should increase, by corresponding 1-dB increments, to 69.00.

i. Reset MAXIMUM BAND LEVEL switches to 60.00 dB, then increase the settings by 10-dB increments. The BAND LEVEL dB indication should increase, by corresponding 10-dB increments, to 150.00. Reset MAXIMUM BAND LEVEL to 60.00 dB.

j. Press the SINGLE MEASUREMENT MODE button, then the START button. A single flash of the BAND LEVEL dB Nixies should occur.

k. Set LOWEST and HIGHEST BAND NUMBER controls to cover a range that includes both calibration channels (refer to paragraph 3.2.2) and all active channels. Set the DISPLAY RATE switch to the MANUAL ADVANCE line. Press the START button. The BAND LEVEL indication should be 60.00 dB (the full-scale calibration channel). Press the MANUAL ADVANCE button once more. The BAND LEVEL indication should be 00.00. The BAND NUMBER lights should be out. Now press the MANUAL ADVANCE again. The BAND NUMBER of the lowest active band should be displayed (ignore the BAND LEVEL indication).

The BAND NUMBER should increase by 1 each time the MANUAL ADVANCE button is pushed, until the highest active band number is reached.

l. Change the MEASUREMENT MODE to MULTIPLE and set the DISPLAY RATE control to each numbered position, from 1 through 64 BANDS PER SECOND, in turn. As the display rate is doubled (for each step) the rate of change of the BAND NUMBER displayed should approximately double (visual check only).

m. Press the STOP button. All displays should disappear and only the power and INTEGRATION lights should be on.

n. Press the START button, then the PAUSE button. The display should remain at the point at which it was interrupted when the PAUSE button was actuated. (Do not use PAUSE when the INTEGRATING light is on; refer to paragraph 3.4.6.) Push the PAUSE button again, to release it and resume operation of the instrument from the pause point.

o. Return the DISPLAY RATE control to 1 BAND PER SECOND. Check the operation of the LOWEST and HIGHEST BAND NUMBER controls by setting them for various combinations. In each case, they should limit the lowest and highest BAND NUMBER displayed to the selected number.

5.2.3 Linearity Test.

Make the setup shown in Figure 5-1. Connect all pins on connector AJ6 in parallel. Set the frequency of the oscillator to 100 Hz and the attenuator to 10 dB (setting of 1 on the "tens" decade). Adjust the output from the oscillator to give a 60.00-dB indication on the 1926. Increase the attenuator setting in 1-dB steps. The BAND LEVEL dB indication must decrease to zero in 1-dB steps and must give identical answers on all channels. Each step must read within ±0.5 dB, except ±1 dB at the extreme low end.

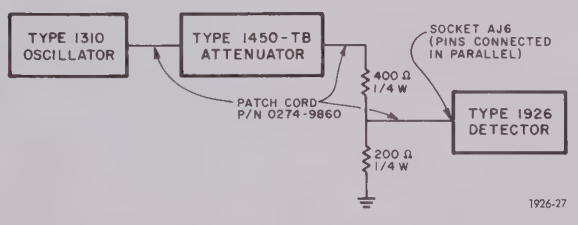


Figure 5-1. Setup for linearity test.

5.3 ADJUSTMENTS.

5.3.1 The 2-MHz Clock.

The frequency of the 2-MHz clock (board M) is adjusted at the factory to be 2 MHz + 0, -2%. If, for any reason, it becomes necessary to readjust it, use the following procedure.

a. Remove the instrument from its cabinet (refer to paragraph 2.3.2) and set it on its side.

b. Connect the 1192 Counter to contact M 45 C on the under side of the mother board (see Figure 5-2).

c. Turn on the POWER to both instruments, and set the 1926 controls as follows:

PANEL DISPLAY.....in
INTEGRATION TIME.....1/8 s
MEASUREMENT MODE.....SINGLE-HOLD
OUTPUT DISPLAY.....PRINTER

d. Adjust inductor L3 on the M board (see Figure 5-3) to 2 MHz + 0, -2%, as read on the 1192 Counter.

5.3.2 The 4.5-V Reference Voltage.

To reset the reference voltage at 4.5 V, use the following procedure:

a. Remove board W and insert the wide extender board (see Figure 5-3) in its place. Plug board W into the extender board.

b. Connect the digital voltmeter across capacitor C3 on board W (see Figure 5-3). Adjust potentiometer R58 (near left-hand edge of board W) to give a reading of 4.5 V ± 2 mV on the voltmeter.

5.4 TROUBLE ANALYSIS.

5.4.1 General.

The modular construction of the 1926 greatly simplifies troubleshooting and servicing procedures. Most components are mounted on plug-in etched boards that can be elevated by means of extender boards, to permit better access to items on the boards. Two extender boards,(P/N 4215-2044, a 24-pin board, and P/N 4215-2754, a 146-pin board) are stored near the right front of the instrument.

To elevate an etched board, remove it from its socket, replace it with an extender board, and plug the original board into the extender. When extenders are used, the circuit board must be inserted in the same position as in the instrument, i.e., with the component side facing the same way. Otherwise the connections will not be correct and component damage may result.

CAUTION

Servicing of the 1926 beyond the board level is not recommended. Any attempt to do so may easily result in additional damage to the complex circuits or to the components on the boards. After localizing the trouble by the procedures described in this section, contact the nearest GR repair facility for further instructions.

For minimum "down" time, a defective etched-circuit board can be easily replaced with a new one. The proce-

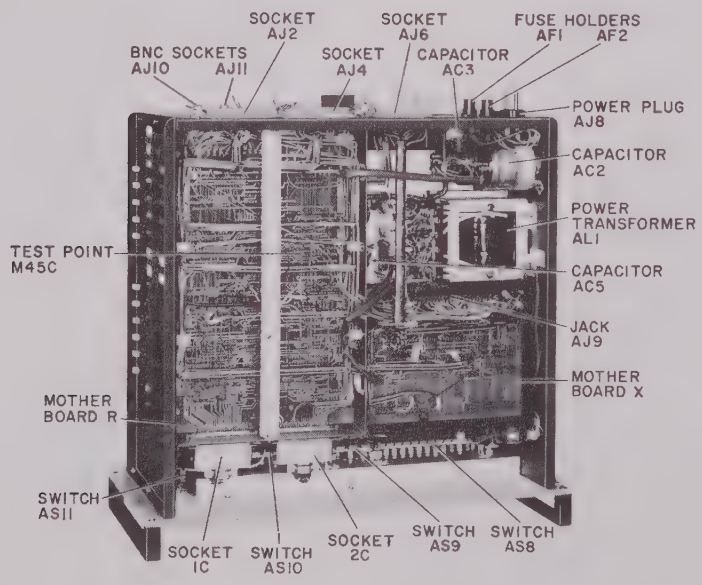


Figure 5-2. Bottom interior view of the Detector.

dures for determining which board or boards are at fault are given in paragraphs 5.4.4 and 5.4.5. Follow the instructions of paragraph 5.4.3 to obtain replacement boards.

5.4.2 Power Supply.

a. Set the line-voltage slide switch on the rear of the 1926 to the voltage range that includes the line voltage to be used (e.g., 115). Also, set the CHASSIS CONNECTED TO GROUND switch to DIRECT.

b. Disconnect all line power to the instrument and remove all etched-circuit boards in the instrument.

c. Apply power to the 1926 through the Variac adjustable autotransformer and adjust the voltage to 115 (or 230).

d. With the fan operating, the power consumption should be 15-17 W.

e. Connect the 1806 Voltmeter between points on the 24-pin jack AJ9 (see Figure 5-2) as listed in Table 5-2. The voltages must be within the stated tolerances.

f. Turn off the line power and plug in board V (power supply). Turn on the power and check that −20 V, dc, exists between ground and pin 24 on jack AJ9. If not, adjust R30 (Figure 5-3) on the V board. The power consumption must now be 20-22 W.

g. Check the regulated no-load voltages according to Table 5-3.

h. Turn off the line power and plug in all boards in the instrument. The power consumption should be 90-95 W. Again check the voltages at AJ9 according to Table 5-3.

i. Connect the oscilloscope from each of the terminals of AJ9 listed in Table 5-3 to ground and check that the ac ripple is less than 5 mV, pk-pk.

5.4.3 Repair of Plug-in Etched Boards.

CAUTION

Disconnect all line power from the instrument before removing or replacing an etched board.

The procedure for the replacement and repair of etched-circuit boards is as follows:

Contact your nearest GR Repair Facility, giving the serial, ID, and type numbers of the instrument, the part number of the defective board(s) to be replaced, and a purchase-order number. The purchase-order number is a means of identification for the shipment of the boards and ensures prompt and efficient handling. It also facilitates billing (if the instrument is out of warranty). The repair facility will arrange for delivery of a replacement board or boards in the shortest time possible. The defective board should be returned *after* the replacement has been received; use the packing supplied with the replacement (or an

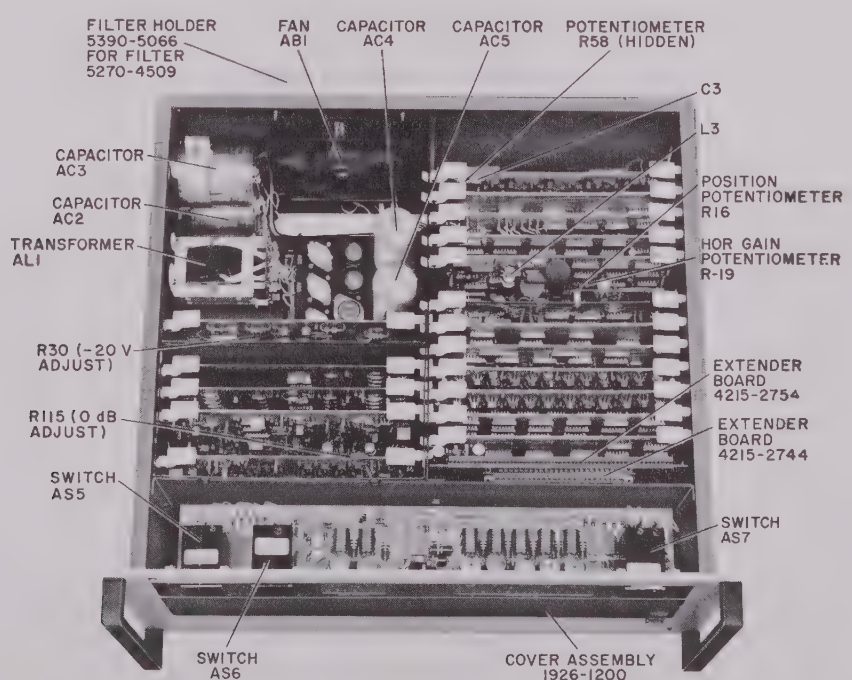


Figure 5-3. Top interior view of the Detector.

TABLE 5-2
No-load Unregulated Power-supply Voltages at AJ9.

BETWEEN PINS	DC VOLTS	TOLERANCE
6-8	+ 11	± 10%
12-17	+ 18	± 10%
GND-4	+ 30	± 5%
GND-20	− 30	± 5%
Green lead-red lead on capacitor AC5 (Figures 5-2 and 5-3)	+250	± 5%

TABLE 5-3
No-load Regulated Power-supply Voltages at AJ9

BETWEEN PINS	DC VOLTS	TOLERANCE
GND-24	− 20	± 2%
GND- 1	+ 20	± 2%
GND- 8	+ 5	± 2%
GND-14	− 16.5	± 2%
GND-17	+ 5	± 2%
GND-19	− 10	± 2%

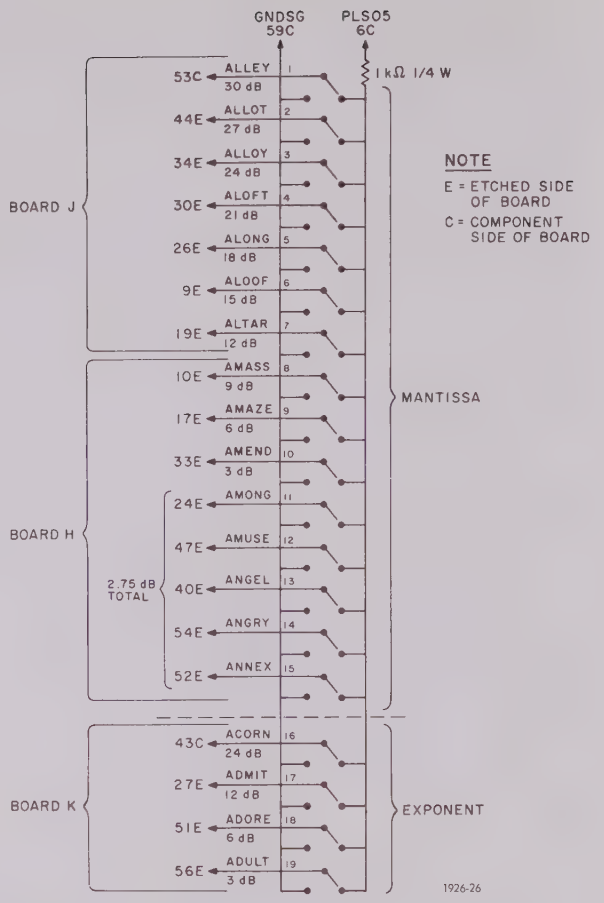


Figure 5-4. Circuit diagram for the special switching assembly, which replaces board G, for trouble analysis. Pin connections refer to board G. The bracketed identifications (board H, board J, board K) indicate which boards are tested by the connections to the designated pins on board G

equivalent amount), to prevent damage to the board in transit. The "Returned Material" number, supplied on a tag with the replacement, should always be used to identify the defective board. Make the shipment to the address given on the tag.

5.4.4 Digital Section.

The use of a special switching assembly (P/N 1926-5988) greatly facilitates localization of the trouble to one board or to a small group of boards. This assembly is available from the Service Department of GR. However, for those wishing to construct their own, the circuit diagram is given in Figure 5-4. The arrows represent small alligator clips, to be attached to the designated pins of the G-board socket. (If more convenient, the clips can be attached to the corresponding points on the under side of the large mother board.) The pins are associated with boards G, H, J, and/or K.

To use the GR switching assembly, remove the G board, insert the wide extender board in the G socket, and plug the switching assembly into the extender. (The assembly is keyed to prevent incorrect insertion.)

In addition to the switching assembly and the extender boards, an oscilloscope is required to complete the test procedures given below for the digital section (refer to Table 5-1).

PERFORM THE FOLLOWING TESTS IN THE ORDER GIVEN.

Test 1.

a. Disconnect the line power.

b. Remove all boards except the following: V, L, M, N. (Board U, the display panel, is not removable.)

c. Connect the jumpers on board P as follows:
For 30-channel system — A-B, E-F, G-H
For 45-channel system — B-C, D-E, G-H
Connect all (6) other jumpers to — (negative).
Install board P.

d. Set the 1926 panel controls as follows:

LOWEST BAND NUMBER (LBN).....0
HIGHEST BAND NUMBER (HBN).....31 or 46 (as required)
MAXIMUM BAND LEVEL (MBL).....60 dB
PANEL DISPLAY.....in
INTEGRATION TIME.....1/8 s
MEASUREMENT MODE.....MULTIPLE
OUTPUT DISPLAY.....NON-STORE
DISPLAY RATE.....MANUAL ADVANCE
PAUSE.....out

Connect the line voltage and turn ON the POWER switch.

Correct indications: All Nixies lit, BAND NUMBER cycling, INTEGRATING light flashing.

Probable malfunction area (in suspect order): board M, N, P, or L.

Test 2.

a. Turn OFF the POWER switch.
b. Install board Q.
c. Turn ON the POWER.
Correct indications: All Nixies and INTEGRATING light flashing, BAND NUMBER cycling.
Probable malfunction area: boards Q, L, or P.

Test 3.

a. Turn OFF the POWER switch.
b. Install the following boards (in addition to those in tests 1 & 2): T, S, H, J, K.
c. Insert the wide extender board (P/N 4215-0754) in the G socket and plug the switching assembly (P/N 1926-5988) into the extender board.
d. Set all switches on the assembly to 0 (down) and turn the POWER switch ON.
Correct indications: BAND LEVEL dB reading X00.00 (X = blank) and flashing.
Probable malfunction area: board H, J, K, T, S, M, or U.

Test 4.

a. Set switches 1 through 10 (on the switching assembly) up, sequentially.

NOTE

All switches not referred to in any step of this test should be down.

The BAND LEVEL indication must correspond to the marking on the switch assembly for each switch (see Figure 5-4).

b. Set switches 11 through 15 up, simultaneously. The BAND LEVEL Nixies must read 2.75 dB.
c. Set switches 16 through 19 up, sequentially. The BAND LEVEL indication must correspond to the marking on the switch assembly for each switch.
d. Set switches 1 and 16 up (all others down); BAND LEVEL indication must be 54 dB.
Probable malfunction area: board H, J, or K, as determined by the particular switch (on the assembly) that indicates trouble (see Figure 5-4). Also, the fault may be on board T or S.

Test 5.

a. Turn OFF the POWER.
b. Connect the CRO to the INTEGRATING lamp socket, terminal U45.
c. Turn ON the POWER and check the integration time for four positions of the INTEGRATION TIME switch by noting the 0-voltage period on the CRO. The allowable limits are given in Table 5-4.

TABLE 5-4
Allowable Limits for Short Integration Times

Integration Time (Seconds)	Limits (Seconds)
1/8	0.093-0.099
1/4	0.190-0.202
1/2	0.421-0.447
1	0.97 -1.03

Note that the times of 1/8, 1/4, and 1/2 s are nominal times, related to the principle that for each reduction in time below 1 s, one-half as many samples are taken as during the next larger time value. However, the wobbulation scheme used to prevent synchronizing on a fixed-frequency signal causes samples to be taken at relatively closely spaced times during the earlier samplings, and at relatively distantly spaced times during the later sampling intervals. Therefore, when a small number of samples is taken, the time required for the total integration is less than the nominal time.
Probable malfunction area: board N, M, P, or L
d. Check the intervals from 2 to 32 s to be approximately correct on the stop watch.
Probable malfunction area: board N, M, P, or L.

Test 6.

a. Set INTEGRATION TIME to 1/8 s.
b. Set left-hand switch (#1) on switch assembly up.
c. Change positions of panel switches as given in Table 5-5 for testing boards L and U. In each case, BAND LEVEL must be X30.00 dB. If not, suspect board H, J, K, T, S, M, or U, in that order.

TABLE 5-5
Tests for Boards L and U

Measurement Mode	Output Display	Correct Indications
1. MULTIPLE	NON-STORE	BAND NUMBER cycles, all Nixies and INTEGRATING lamp flash continuously after first START command.
2. SINGLE-HOLD	NON-STORE	BAND NUMBER cycles continuously without flashing, INTEGRATING lamp out.
3. SINGLE	NON-STORE	BAND NUMBER cycles once, X30.00 momentarily displayed, INTEGRATING lamp lights momentarily for each START command.
4. MULTIPLE	STORE-NO ERASE	Same as 1.
5. SINGLE-HOLD	STORE-NO ERASE	Same as 2.
6. SINGLE	STORE-NO ERASE	Same as 3.
7. SINGLE	STORE-ERASE	BAND NUMBER cycles and flashes, BAND LEVEL flashes, INTEGRATING lamp flashes but visibly out of phase with Nixie flashing.
8. SINGLE-HOLD	STORE-ERASE	BAND NUMBER cycles and flashes, BAND LEVEL flashes, INTEGRATING lamp off.
9. SINGLE	STORE-ERASE	Press START; INTEGRATING lamp lights momentarily, after slight pause, BAND NUMBER cycles once, BAND LEVEL flashes once, all Nixies and INTEGRATING lamp remain off.
10. MULTIPLE	XY PLOT	Press START; INTEGRATING lamp flashes once, BAND LEVEL displayed continuously, BAND NUMBER out. Press MANUAL ADVANCE once; no change. Press again; BAND NUMBER displays 02. Set DISPLAY RATE switch to 1, 2, 4 . . . 64 and note corresponding change in rate. About 1/2 s pause should be evident after each integration.
11. MULTIPLE	PRINTER	Same as 10, but no pause after integration. Pressing PAUSE stops the display cycle; releasing PAUSE restarts it. Pressing STOP leaves INTEGRATING lamp on and all Nixies off.

Test 7.

The following procedures check the operation of the BAND NUMBER Nixies.

a. Set LOWEST BAND NUMBER (LBN) to X0 (X = blank)
HIGHEST BAND NUMBER (HBN) to X0.
MEASUREMENT MODE to MULTIPLE
The BAND NUMBER Nixies must be out.

b. Change LBN and HBN to X1. The BAND NUMBER Nixies should remain out.

c. Advance LBN and HBN, simultaneously, by units, then by tens, until the entire range of the instrument has been covered. In each case, the BAND NUMBER displayed must correspond to the LBN and HBN settings. Only one BAND NUMBER should be displayed for each integration.

d. Set LBN to X0 and HBN to 31 (or 46).

If an incorrect indication is obtained for any of these tests, suspect board Q, P, or L.

Test 8.

Set switches 1 and 16 up (all others down), advance the MAXIMUM BAND LEVEL (MBL) switches, in increments of 1 dB, to 70, then, in increments of 10, to 150. In each case, the BAND LEVEL displayed should be 6 dB below the MBL setting. If not, suspect board T or U.

Test 9.

Turn OFF the POWER switch and remove the board-G switch assembly and the extender board. Replace the original G board and set the INTEGRATION TIME to 1/8 s and the MBL to 00. Turn ON the POWER switch. The BAND LEVEL indication should be X24.00 dB. If not, suspect board G.

5.4.5 Analog Section.

All boards must be inserted except B*, C, D, and E.

The analog section of the 1926 is suspect only after the above tests on the power supply and on the digital section have been completed and an incorrect indication has not been discovered on any of the above tests. The analog section includes boards B*, C, D, and E. Insert board W. If B, C, and D are removed, the BAND LEVEL should indicate 18 dB. If not, suspect board E. Then, if board D is inserted without E, the BAND LEVEL should read 54 dB. If not, suspect board D. When neither of these tests indicate the trouble in a faulty analog section, suspect board B* or C.

*Board B is supplied with 45-channel instruments only.

5.4.6 Mother boards.

Trouble-shooting and repairing of the mother boards (R and X) is extremely difficult. When the malfunction area is found to be on one of these boards, the complete instrument should be returned to the factory for servicing.

5.5 KNOB REMOVAL.

To remove the DISPLAY RATE knob on the front-panel, either to replace one that has been damaged or to replace the associated control, proceed as follows:

a. Grasp the knob firmly with the fingers, close into the panel and pull the knob straight, away from the panel.

b. Observe the position of the setscrew in the bushing with respect to the panel markings.

c. Release the setscrew with an Allen wrench and pull the bushing off the shaft.

d. Remove and retain the black nylon thrust washer, behind the knob.

NOTE

To separate the bushing from the knob, if for any reason they should be combined off the instrument, drive a machine tap a turn or two into the bushing to provide sufficient grip for for easy separation.

5.6 KNOB INSTALLATION.

To install the "Snap-on" knob assembly on the DISPLAY RATE shaft:

a. Place the black nylon thrust washer over the control shaft.

b. Mount the bushing on the shaft, using a small slotted piece of wrapping paper as a shim for adequate panel clearance.

c. Orient the setscrew on the bushing with respect to the panel-marking index and lock the setscrew with an Allen wrench.

NOTE

Make sure that the end of the shaft does not protrude through the bushing or the knob will not seat properly.

d. Place the knob on the bushing with the retention spring opposite the setscrew.

e. Push the knob in until it bottoms and pull it slightly to check that the retention spring is seated in the groove in the bushing.

NOTE

If the retention spring in the knob comes loose, reinstall it in the interior notch with the small slit in the outer wall.

TABLE 5-6
Etched-circuit Boards in the 1926

BOARD	GR PART NUMBER	FUNCTION	REMARKS
V	1926-4748	Power Supply	
W	-4733	Output Buffers and D-A Converter	4.5-V reference
B	-4736	Multiplexer	Highest 15 channels
C	-4739	Multiplexer	Lowest 30 channels
D	-4742	Sample-Hold	
E	-4745	A-D Converter	
G	-4715	Squarer	
H or HH*	-4706	Slice 1	
	-4707		
J or JJ*	-4709	Slice 2	
	-4710		
K or KK*	-4712	Slice 3	
L	-4718	System Control 2	Piggy-back; attached to board 1926-4718
	-4760	System Control	
M	-4721	System Control 1	
N	-4724	Modulated Osc. and Counter	
P	-4727	Channel Identification	Contains CHANNEL ADDRESS REGISTER
Q	-4730	Channel Display	
R	-4751	Mother Board (large)	Computer
S	-4703	Log Converter	
T	-4700	Output Decoder	
U	-4757	Display Panel	
X	-4754	Mother Board (small)	Input

*Double-lettered boards are used in 45-channel models in place of boards with the same single letter.

Parts Lists and Diagrams—Section 6

ITEM	PAGE
Signal Index	6-2, thru 6-5
Federal Manufacturer's Code	6-6
Mechanical Parts, Front Panel.	6-7
Mechanical Parts, Rear Panel	6-7
Multiplexers, B and C	6-9 and 6-11
Sample-Hold, D	6-13, 6-15
A-D Converter, E	6-17, 6-19
Squarer, G	6-21
Slice 1, H and HH	6-23
Slice 2, J and JJ	6-25
Slice 3, K and KK	6-27
System Control 2, L	6-29 and 6-31
System Control 1, M	6-33, 6-35
Modulated Oscillator and Counter, N	6-37
Channel Identification, P	6-39, 6-41
Channel Display, Q	6-43
Mother Board, large, R	6-44, 6-45, 6-47
Log Converter, S	6-45, 6-47
Output Decoder, T	6-49
Display Panel, U	6-51
Power Supply, V	6-53
Output Buffers and D-A Converter, W	6-55
Mother Board, small, X	6-57
Front-panel Interface	6-57
Rear-panel Interface	6-59

NOTE

The parts list, etched-board assembly diagram and schematic diagram for a specific circuit are located on adjacent pages, and are given in alphabetical order, by board letter.

Each reference designator used in our schematic diagrams and circuit descriptions now includes an initial letter, before a hyphen, to identify the subassembly. The numeric portion of each designator is generally shorter than would be the case if a block of numbers was assigned to each subassembly. A new designation WT (wire-tie point) replaces the customary AT (anchor terminal). The letter before the hyphen may be omitted only if clearly understood, as within a subassembly schematic diagram.
Examples: B-R8 = B board, resistor 8; D-WR2 = D board, wire-tie point 2, CR6 on the V schematic is a shortened form of V-CR6 = V board, diode 6. The instrument may contain A-R1, B-R1, C-R1, and D-R1, etc.

SIGNAL INDEX

NOTES

Leads are identified, in practically all cases, by a five-letter word selected at random from a dictionary of the English language. There is no significance whatsoever to any name, other than mere identification of a connection from one point to another.

Letter C as a suffix in an identification (example, L42C) refers to the component side of the etched-circuit boards. Letter E as a suffix (example, T23E) refers to etched wiring (non-component) side of the etched-circuit boards.

Within any single alphabetical designation by five-letter word, the listing starts with front-panel connections (if any), then gives connections at front edge of large mother board (i any), then lists connections to individual plug-in boards E through W, inclusive, by alphabetical order of the boards, and finishes with rear-panel and miscellaneous connections, such as chassis-mounted relays and transistors. Connectors at front o large mother board are identified thus:

1C is connector 1, located at outer side of instrument.

2C is connector 2, located nearer center of instrument.

Note 1. This note designates a lead brought to a connector but not used anywhere else in the instrument.

Table 6-1
SIGNAL INDEX

Code	Function
ABBEY	A/D CONVERTER OUTPUT, 2-TO-THE-3RD WEIGHT
ABHOR	A/D CONVERTER OUTPUT, 2 SQUARED WEIGHT
ABIDE	A/D CONVERTER OUTPUT, 2 WEIGHT
ABUSE	A/D CONVERTER OUTPUT, 1 WEIGHT
ABYSS	A/D CONVERTER OUTPUT, 1 STATE FOR COARSE RANGE
ACORN	A/D CONVERTER OUTPUT, FINE RANGE, 4 WEIGHT ALSO SQUARED EXPONENT, 8 WEIGHT
ACRID	A/D CONVERTER OUTPUT, FINE RANGE, 2 WEIGHT
ACTOR	A/D CONVERTER OUTPUT, FINE RANGE, 1 WEIGHT
ADEPT	INPUT TO A/D CONVERTER
ADMIT	SQUARED EXPONENT, 4 WEIGHT
ADORE	SQUARED EXPONENT, 2 WEIGHT
ADORN	SAMPLE/HOLD CLOCK
ADULT	SQUARED EXPONENT, 1 WEIGHT
ALLEY	SQUARED MANTISSA, 2-TO-THE-14TH WEIGHT
ALLOT	SQUARED MANTISSA, 2-TO-THE-13TH WEIGHT
ALLOY	SQUARED MANTISSA, 2-TO-THE-12TH WEIGHT
ALOFT	SQUARED MANTISSA, 2-TO-THE-11TH WEIGHT
ALONG	SQUARED MANTISSA, 2-TO-THE-10TH WEIGHT
ALOOF	SQUARED MANTISSA, 2-TO-THE-9TH WEIGHT
ALTAR	SQUARED MANTISSA, 2-TO-THE-8TH WEIGHT
AMASS	SQUARED MANTISSA, 2-TO-THE-7TH WEIGHT
AMAZE	SQUARED MANTISSA, 2-TO-THE-6TH WEIGHT
AMEND	SQUARED MANTISSA, 2-TO-THE-5TH WEIGHT
AMONG	SQUARED MANTISSA, 2-TO-THE-4TH WEIGHT
AMUSE	SQUARED MANTISSA, 2-TO-THE-3RD WEIGHT
ANGEL	SQUARED MANTISSA, 2 SQUARED WEIGHT
ANGRY	SQUARED MANTISSA, 2 WEIGHT
ANNEX	SQUARED MANTISSA, 1 WEIGHT
ANNOY	INTEGRATION TIME CONTROL. GROUND FOR 1/8 SECOND.
ANTIC	INTEGRATION TIME CONTROL. GROUND FOR 1/2 SECOND.
ANVIL	INTEGRATION TIME CONTROL. GROUND FOR 1/4 SECOND.
ARGON	ANSWER IN DB IN BINARY, 2-TO-THE-5TH WEIGHT
ARMOR	ANSWER IN DB IN BINARY, 2-TO-THE-4TH WEIGHT
AROMA	ANSWER IN DB IN BINARY, 2 SQUARED WEIGHT
AROSE	ANSWER IN DB IN BINARY, 2-TO-THE-3RD WEIGHT
ARRAY	ANSWER IN DB IN BINARY, 2 WEIGHT
ARSON	ANSWER IN DB IN BINARY, 1 WEIGHT
ASCOT	ANSWER IN DB IN BINARY, 1/2 WEIGHT
ASIDE	ANSWER IN DB IN BINARY, 1/4 WEIGHT
ASPIC	TRANSFER COMMAND ENTERING DB BINARY ANSWER INTO STORAGE
ASSAY	STORED ANSWER DB IN BINARY, 2-TO-THE-5TH WEIGHT
ASSET	STORED ANSWER DB IN BINARY, 2-TO-THE-4TH WEIGHT
ASTER	STORED ANSWER DB IN BINARY, 2-TO-THE-3RD WEIGHT
ATONE	STORED ANSWER DB IN BINARY, 2 SQUARED WEIGHT
ATTIC	STORED ANSWER DB IN BINARY, 2 WEIGHT
AUDIT	STORED ANSWER DB IN BINARY, 1 WEIGHT
AUGER	STORED ANSWER DB IN BINARY, 1/2 WEIGHT
AVAIL	STORED ANSWER DB IN BINARY, 1/4 WEIGHT
AWOKE	TRANSFER COMMAND ENTERING DB BCD ANSWER INTO STORAGE
BACON	MAX BAND LEVEL DB, BCD, 10 WEIGHT
BADGE	MAX BAND LEVEL DB, BCD, 20 WEIGHT
BAGGY	MAX BAND LEVEL DB, BCD, 40 WEIGHT
BALKY	MAX BAND LEVEL DB, BCD, 80 WEIGHT
BANJO	MAX BAND LEVEL DB, BCD, 8 WEIGHT
BARGE	MAX BAND LEVEL DB, BCD, 4 WEIGHT
BARON	MAX BAND LEVEL DB, BCD, 2 WEIGHT
BASIS	MAX BAND LEVEL DB, BCD, 1 WEIGHT
BIRTH	CONTROL PULSE, STOPS OPERATION AFTER SINGLE INTEGRATE AND DISPLA
BLAME	CONTROL PULSE TO ADVANCE DISPLAY TO NEXT BAND NUMBER
BLAST	CONTROL PULSE CAUSING INSTRUMENT TO PAUSE AND DISPLAY AN ANSWER
BLAZE	CONTROL PULSE. GENERATES DEAD TIME WHILE X-AXES OF SCOPES AND PLOTTERS RESET AFTER DISPLAY.
BLEND	CONTROL PULSE STARTS NEW MEASUREMENT IN 'MULTIPLE' MODE
BLOND	LEAST SIGNIFICANT BIT OF EXPONENT ENTERS MEMORY CELL
BRASH	LEAST SIGNIFICANT BIT OF EXPONENT LEAVES MEMORY CELL
BREED	DELIVERS MULTIPLEXER OUTPUT TO SAMPLE/HOLD BOARD
BURNT	COMMAND TO WRITE INFORMATION INTO MEMORY CELLS
COAST	0 VOLTS ON THIS LINE SHOWS ACCUMULATOR EXPONENT AND MEMORY BUFFER EXPONENTS ARE EQUAL
COUCH	DURING OUTPUT, 32 WEIGHT BINARY CONTRIBUTION OF EXPONENT
COULD	DURING OUTPUT, 16 WEIGHT BINARY CONTRIBUTION OF EXPONENT
COULD	DURING OUTPUT, 8 WEIGHT BINARY CONTRIBUTION OF EXPONENT
COURT	DURING OUTPUT, 4 WEIGHT BINARY CONTRIBUTION OF EXPONENT
COVER	DURING OUTPUT, 2 WEIGHT BINARY CONTRIBUTION OF EXPONENT
CRACK	DURING OUTPUT, 1 WEIGHT BINARY CONTRIBUTION OF EXPONENT
CRAFT	DURING OUTPUT, 1/8 WEIGHT BINARY CONTRIBUTION OF EXPONENT
CRANE	DURING OUTPUT, 2 WEIGHT BINARY CONTRIBUTION OF MANTISSA
CRANK	DURING OUTPUT, 1 WEIGHT BINARY CONTRIBUTION OF MANTISSA
CRAWL	DURING OUTPUT, 1/2 WEIGHT BINARY CONTRIBUTION OF MANTISSA
CRAZE	DURING OUTPUT, 1/4 WEIGHT BINARY CONTRIBUTION OF MANTISSA
CREAM	DURING OUTPUT, 1/8 WEIGHT BINARY CONTRIBUTION OF MANTISSA

SIGNAL-INTERCONNECTION CHART

Code	Routing
ABBEY	E18C
ABBEY	G11C
ABHOR	E19C
ABHOR	G12C
ABIDE	E27C
ABIDE	G13C
ABUSE	E22E
ABUSE	G14C
ABYSS	D44E
ABYSS	E20C
ABYSS	G21C
ACORN	E16C
ACORN	K25E
ACRID	E15C
ACRID	G22C
ACTOR	E17C
ACTOR	G23C
ADEPT	D47C
ADEPT	E55E
ADMIT	G27E
ADMIT	K26E
ADORE	G51E
ADORE	K52E
ADORN	D41E
ADORN	E11C
ADULT	G56E
ADULT	K56E
ALLEY	G53C
ALLEY	J53C
ALLOT	G44E
ALLOT	J44C
ALLOY	G34E
ALLOY	J34C
ALOFT	G30E
ALOFT	J30C
ALONG	G26E
ALONG	J26C
ALOOF	G09E
ALOOF	J09C
ALTAR	G19E
ALTAR	J19C
AMASS	G10E
AMASS	H10C
AMAZE	G17E
AMAZE	H17C
AMEND	G33E
AMEND	H33C
AMONG	G24E
AMONG	H26C
AMUSE	G47E
AMUSE	H47C
ANGEL	G40E
ANGEL	H40C
ANGRY	G54E
ANGRY	H54C
ANNEX	G52E
ANNEX	H53C
ANNOY	AS 8-03-5
ANNOY	2C17
ANNOY	N08E
ANNOY	S50C
ANNOY	AJ2-30
ANTIC	AS 8-05-5
ANTIC	2C16
ANTIC	N09E
ANTIC	S49C
ANTIC	AJ2-32
ANVIL	AS 8-04-5
ANVIL	2C15
ANVIL	N13C
ANVIL	S48C
ANVIL	AJ2-31
ARGON	H25C
ARGON	J21C
ARGON	T50C
ARMOR	H14C
ARMOR	T50E
AROMA	H27C
AROMA	T49C
AROSE	H18C
AROSE	T49E
ARRAY	H34C
ARRAY	T56E
ARSON	H41C
ARSON	T55E
ASCOT	H42C
ASCOT	T53E
ASIDE	H48C
ASIDE	T54E
ASPIC	M41C
ASPIC	T52E
ASSAY	T47C
ASSAY	W46C
ASSET	T48E
ASSET	W48C
ASTER	T45E
ASTER	W45C
ATONE	T48C
ATONE	W47C
ATTIC	T51E
ATTIC	W49C
AUDIT	T54C
AUDIT	W50C
AUGER	T11E
AUGER	W43C
AVAIL	T12C
AVAIL	W44C
AWOKE	T25C
BACON	U14
BACON	2C20
BACON	T57E
BADGE	U16
BADGE	2C46
BADGE	T57C
BAGGY	U19
BAGGY	2C21
BAGGY	T58E
BALKY	U24
BALKY	2C47
BALKY	T58C
BANJO	U12
BANJO	2C43
BANJO	T51C
BARGE	U07
BARGE	2C45
BARGE	T56C
BARON	U06
BARON	2C44
BARON	T55C
BASIS	U05
BASIS	2C19
BASIS	T52C
BIRTH	L56C
BIRTH	M56E
BLAME	L54E
BLAME	M54C
BLAST	L55E
BLAST	M56C
BLAZE	L42C
BLAZE	M44C
BLEND	L49E
BLEND	M47C
BLOND	J52E
BLOND	K52C
BRASH	J56C
BRASH	K56C
BREED	B06E
BREED	C06E
BREED	D06C
BREED	D06E
BURNT	H10E
BURNT	J10E
BURNT	K10E
BURNT	M38C
COAST	K08E
COAST	M07E
CORPS	J14C
CORPS	S29C
COUCH	H11C
COUCH	S25C
COULD	H15C
COULD	S28C
COURT	H32C
COURT	S27C
COVER	H22C
COVER	S15C
CRACK	H46C
CRACK	S24C
CRAFT	H51C
CRAFT	S17C
CRANE	H35C
CRANE	S08C
CRANK	H36C
CRANK	S07C
CRAWL	H28C
CRAWL	S09C
CRAZE	H50C
CRAZE	S10C
CREAM	H49C
CREAM	S11C

Table 6-1
SIGNAL INDEX

Code	Function
CREEK	MEMORY BUFFER OUTPUT, 2-TO-THE-14TH WEIGHT
CROWN	ENABLES READ-IN TO ACCUMULATOR
CRUDE	ENABLES SHIFTING OF ACCUMULATOR
CRUSH	EFFECTS TRANSFER OF DATA INTO ACCUMULATOR
CURRY	ENABLES SWAP BETWEEN ACCUMULATOR AND MEMORY BUFFER
CURVE	ENABLES READING OF MEMORY INTO MEMORY BUFFER
CYNIC	EFFECTS TRANSFER OF DATA INTO MEMORY BUFFER
DADDY	ENABLES BINARY CONTRIBUTIONS OF EXPONENT AND MANTISSA IN DB TO BE TRANSFERRED INTO ACCUMULATOR AND MEMORY BUFFER
DANCE	INDICATES SPILL INTO 2-TO-THE-15TH WEIGHT OF ACCUMULATOR
DANDY	0 VOLTS IF SWAP IS REQUIRED, +5 VOLTS FOR NO SWAP
DEFER	CARRY FROM BOARD H(H) TO BOARD J(J) ADDERS
DEIGN	ENABLES SWAP OF EXPONENTS BETWEEN ACCUMULATOR AND MEMORY BUFFER
DEMON	EFFECTS DATA TRANSFER INTO ACCUMULATOR AND ACCUMULATOR EXPONENT
DEMUR	EFFECTS DATA TRANSFER INTO MEMORY BUFFER
DEVIL	ENABLES SWAP BETWEEN ACCUMULATOR AND MEMORY BUFFER
DIRGE	POSITIVE VOLTAGE IDENTIFIES EXISTENCE OF OUTPUT MODE
DITCH	POSITIVE VOLTAGE IDENTIFIES EXISTENCE OF INTEGRATE MODE
DITTY	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 1 WEIGHT
DODGE	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 2 WEIGHT
DOLLY	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 4 WEIGHT
DONNA	INHIBIT FIRST 'WAIT FOR WOBBULATION' PULSE
DONOR	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 8 WEIGHT
DOUGH	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 10 WEIGHT
DRAFT	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 20 WEIGHT
DRAKE	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 40 WEIGHT
DRAMA	REMOTE PROGRAMMING OF MAX BAND LEVEL, BCD, 80 WEIGHT
DREAM	RECOGNITION OF LAST CHANNEL IN OUTPUT MODE
DROVE	RECOGNITION OF LAST CHANNEL IN INTEGRATE MODE
DWARF	COLDSTART PULSE. RESETS EVERYTHING FOR NEW MEASUREMENT.
EAGLE	INCREMENTS CHANNEL ADDRESS REGISTER
ELECT	BAND NUMBER, BCD, 40 WEIGHT, NEGATIVE LOGIC
ELEGY	BAND NUMBER, BCD, 20 WEIGHT, NEGATIVE LOGIC
ELITE	BAND NUMBER, BCD, 10 WEIGHT, NEGATIVE LOGIC
ELOPE	BAND NUMBER, BCD, 8 WEIGHT, NEGATIVE LOGIC
EMBER	BAND NUMBER, BCD, 4 WEIGHT, NEGATIVE LOGIC
ENACT	BAND NUMBER, BCD, 2 WEIGHT, NEGATIVE LOGIC
ENDOW	BAND NUMBER, BCD, 1 WEIGHT, NEGATIVE LOGIC
ENVOY	LOW CHANNEL NUMBER, BCD, 40 WEIGHT, NEGATIVE LOGIC
EPOCH	LOW CHANNEL NUMBER, BCD, 20 WEIGHT, NEGATIVE LOGIC
EQUIP	LOW CHANNEL NUMBER, BCD, 10 WEIGHT, NEGATIVE LOGIC
ERECT	LOW CHANNEL NUMBER, BCD, 8 WEIGHT, NEGATIVE LOGIC
ERUPT	LOW CHANNEL NUMBER, BCD, 4 WEIGHT, NEGATIVE LOGIC
ESSAY	LOW CHANNEL NUMBER, BCD, 2 WEIGHT, NEGATIVE LOGIC
EVADE	LOW CHANNEL NUMBER, BCD, 1 WEIGHT, NEGATIVE LOGIC

Code	Function
EXACT	0 VOLTS INHIBITS DISPLAY OF ANSWER, +5 VOLTS ALLOWS DISPLAY
EXALT	HIGH CHANNEL NUMBER, BCD, 20 WEIGHT, NEGATIVE LOGIC
EXCEL	HIGH CHANNEL NUMBER, BCD, 40 WEIGHT, NEGATIVE LOGIC
EXILE	HIGH CHANNEL NUMBER, BCD, 10 WEIGHT, NEGATIVE LOGIC
FABLE	HIGH CHANNEL NUMBER, BCD, 8 WEIGHT, NEGATIVE LOGIC
FACET	HIGH CHANNEL NUMBER, BCD, 4 WEIGHT, NEGATIVE LOGIC
FAINT	HIGH CHANNEL NUMBER, BCD, 2 WEIGHT, NEGATIVE LOGIC
FAITH	HIGH CHANNEL NUMBER, BCD, 1 WEIGHT, NEGATIVE LOGIC
FEAST	MULTIPLEXER ADDRESS 0
FETCH	MULTIPLEXER ADDRESS 1
FEVER	MULTIPLEXER ADDRESS 3
FIBER	MULTIPLEXER ADDRESS 4
FIELD	MULTIPLEXER ADDRESS 5
FIGHT	MULTIPLEXER ADDRESS 2
FILMY	MULTIPLEXER ADDRESS 6
FINCH	MULTIPLEXER ADDRESS 7
FLARE	MULTIPLEXER ADDRESS A
FLASK	MULTIPLEXER ADDRESS B
FLEET	MULTIPLEXER ADDRESS C
FLIER	MULTIPLEXER ADDRESS D
FLING	MULTIPLEXER ADDRESS E
FLIRT	MULTIPLEXER ADDRESS F
FLOCK	CLEAR MEMORY DURING FIRST SAMPLING OF EACH CHANNEL
FLOSS	RESUME DATA PROCESSING AFTER A PAUSE FOR WOBBULATION
FOUND	SUBSET RECOGNITION
FRAIL	2 MHZ (OR LOWER) CLOCK PULSES TO WOBBULATED OSCILLATOR
FRAME	POSITIVE VOLTAGE STEP AT END OF INTEGRATE MODE
FRANK	SUBSET CONTROL. GROUND FOR 16 MICROPHONES.
FRAUD	SUBSET CONTROL. GROUND FOR 8 MICROPHONES.
FRESH	REMOTE BAND ADVANCE DURING DISPLAY
FRIAR	REMOTE CONTROL FOR START OF NEW MEASUREMENT
FRIED	SUBSET CONTROL. GROUND FOR 4 MICROPHONES.
FRILL	SUBSET CONTROL. GROUND FOR 2 MICROPHONES.
FRONT	COLDSTART PULSE TO RESET WOBBULATED OSCILLATOR AND COUNTER
GAUSE	COMMAND TO TAKE SAMPLE
GHOST	INHIBITS LAST 'WAIT FOR WOBBULATION' PULSE
GIVEN	1 MHZ CLOCK PULSES (OPPOSITE PHASE FROM GLAND)
GLAND	1 MHZ CLOCK PULSES (OPPOSITE PHASE FROM GIVEN)
GLARE	CONTROL LINE. GROUND FOR 'MULTIPLE' OPERATION.
GLASS	CONTROL LINE. GROUND FOR 'SINGLE' OPERATION.
GLINT	GROUND FOR 1 SECOND AND SHORTER INTEGRATION TIMES.
GLOAT	GROUND FOR 2 SECOND INTEGRATION TIME.
GLOBE	GROUND FOR 4 SECOND INTEGRATION TIME.
GLOOM	GROUND FOR 8 SECOND INTEGRATION TIME.

SIGNAL-INTERCONNECTION CHART

Code	Routing
CREEK	J50E
CREEK	S45C
CROWN	H52C
CROWN	J52C
CROWN	K55E
CROWN	M28C
CRUDE	H12C
CRUDE	J12C
CRUDE	K12E
CRUDE	M14C
CRUSH	H43C
CRUSH	M21C
CURRY	J09E
CURRY	M35C
CURVE	H55C
CURVE	J55C
CURVE	K55C
CURVE	M29C
CYNIC	J57C
CYNIC	K57C
CYNIC	M40C
DADDY	H13C
DADDY	J13C
DADDY	M24C
DANCE	J51C
DANCE	M11C
DANDY	K11E
DANDY	M10C
DEFER	H08C
DEFER	J08C
DEIGN	K09E
DEIGN	M23C
DEMON	J11C
DEMON	K14E
DEMON	M22C
DEMUR	H37C
DEMUR	M39C
DEVIL	H56C
DEVIL	M36C
DIRGE	H07C
DIRGE	J07C
DIRGE	K07E
DIRGE	L21E
DIRGE	M16C
DIRGE	P36C
DIRGE	Q20C
DIRGE	W39C
DIRGE	AJ3-06
DIRGE	AJ4-17
DITCH	U39
DITCH	2C04
DITCH	H25E
DITCH	J25E
DITCH	K26C
DITCH	L31C
DITCH	M08E
DITCH	N18C
DITCH	P52C
DITCH	AJ2-49
DITCH	AJ3-05
DITTY	U03
DITTY	2C31
DITTY	AJ3-21
DODGE	U75
DODGE	2C30
DODGE	AJ3-22
DOLLY	U09
DOLLY	2C32
DOLLY	AJ3-09
DONNA	M43E
DONNA	N43C
DONOR	U11
DONOR	2C33
DONOR	AJ3-10
DOUGH	U13
DOUGH	2C34
DOUGH	AJ3-23
DRAFT	U15
DRAFT	2C35
DRAFT	AJ3-24
DRAKE	U18
DRAKE	2C36
DRAKE	AJ3-11
DRAMA	U21
DRAMA	2C37
DRAMA	AJ3-12
DREAM	L22C
DREAM	P44C
DREAM	Q34C
DROVE	M55E
DROVE	P53C
DWARF	L48C
DWARF	M07C
DWARF	P57C
EAGLE	M08C
EAGLE	P56E
ELECT	U51
ELECT	1C19
ELECT	P24C
ELECT	Q24C
ELEGY	U52
ELEGY	1C18
ELEGY	P22C
ELEGY	Q22C
ELITE	U53
ELITE	2C26
ELITE	P30C
ELITE	Q30C
ELOPE	U44
ELOPE	1C22
ELOPE	P28C
ELOPE	Q28C
EMBER	U43
EMBER	2C03
EMBER	P33C
EMBER	Q33C
ENACT	U42
ENACT	1C21
ENACT	P27C
ENACT	Q27C
ENDOW	U41
ENDOW	1C20
ENDOW	P26C
ENDOW	Q26C
ENVOY	AS 5-01-4 OR 40
ENVOY	U72
ENVOY	1C12
ENVOY	Q16C
ENVOY	AJ2-13
EPOCH	AS 5-01-2 OR 20
EPOCH	U71
EPOCH	1C14
EPOCH	Q17C
EPOCH	AJ2-39
EQUIP	AS 5-01-1 OR 10
EQUIP	U70
EQUIP	1C15
EQUIP	AJ2-38
ERECT	AS 5-02-8
ERECT	U68
ERECT	1C16
ERECT	Q19C
ERECT	AJ2-12
ERUPT	AS 5-02-4
ERUPT	U67
ERUPT	1C17
ERUPT	Q21C
ERUPT	AJ2-11
ESSAY	AS 5-02-2
ESSAY	U66
ESSAY	1C25
ESSAY	Q29C
ESSAY	AJ2-37
EVADE	AS 5-02-1
EVADE	U65
EVADE	2C27
EVADE	Q31C
EVADE	AJ2-36
EXACT	L34C
EXACT	Q32C
EXALT	AS 6-01-2 OR 20
EXALT	U62
EXALT	1C03
EXALT	Q08C
EXALT	AJ2-43
EXCEL	AS 6-01-4 OR 40
EXCEL	U63
EXCEL	1C01
EXCEL	Q07C
EXCEL	AJ2-17
EXILE	AS 6-01-1 OR 10
EXILE	U61
EXILE	1C05
EXILE	Q09C
EXILE	AJ2-42
FABLE	AS 6-02-8
FABLE	U59
FABLE	1C07
FABLE	Q10C
FABLE	AJ2-16
FACET	AS 6-02-4
FACET	U58
FACET	1C09
FACET	Q11C
FACET	AJ2-15
FAINT	AS 6-02-2
FAINT	U57
FAINT	1C10
FAINT	Q12C
FAINT	AJ2-41
FAITH	AS 6-02-1
FAITH	U56
FAITH	1C11
FAITH	Q13C
FAITH	AJ2-40
FEAST	B32E
FEAST	C32E
FEAST	P37C
FETCH	B33E
FETCH	C33E
FETCH	P38C
FEVER	B35E
FEVER	C35E
FEVER	P39C
FIBER	B36E
FIBER	C36E
FIBER	P41C
FIELD	B37E
FIELD	C37E
FIELD	P47C
FIGHT	B34E
FIGHT	C34E
FIGHT	P40C
FILMY	B44E
FILMY	C39E
FILMY	P49C
FINCH	B45E
FINCH	C40E
FINCH	P48C
FLARE	C25E
FLARE	P46C
FLASK	C26E
FLASK	P50C
FLEET	C27E
FLEET	P45C
FLIER	C28E
FLIER	P54C
FLING	B25E
FLING	P55E
FLIRT	B26E
FLIRT	P55C
FLOCK	M20C
FLOCK	N19C
FLOSS	M55C
FLOSS	N53C
FOUND	M51C
FOUND	N12C
FRAIL	L39C
FRAIL	N54C
FRAME	M53C
FRAME	N11C
FRANK	N07C
FRANK	AJ3-02
FRAUD	N07E
FRAUD	AJ3-01
FRESH	L17C
FRESH	AJ2-27
FRIAR	M48E
FRIAR	AJ2-01
FRIAR	AJ3-17
FRIED	N08C
FRIED	AJ3-14
FRILL	N09C
FRILL	AJ3-13
FRONT	M50C
FRONT	N42C
GAUZE	D43E
GAUZE	E13C
GAUZE	G08E
GAUZE	M09C
GHOST	M46C
GHOST	N10C
GIVEN	L50C NOTE 1.
GLAND	L42E NOTE 1.
GLARE	AS 9-03-5
GLARE	2C06
GLARE	L32E
GLARE	AJ2-28
GLASS	AS 9-01-5
GLASS	2C07
GLASS	L33E
GLASS	AJ2-03
GLINT	AS 8-03-2
GLINT	AS 8-04-2
GLINT	AS 8-05-2
GLINT	AS 8-06-2
GLINT	2C48
GLINT	L51C
GLINT	AJ2-05
GLOAT	AS 8-07-2
GLOAT	2C49
GLOAT	L52C
GLOAT	AJ2-06
GLOBE	AS 8-08-2
GLOBE	2C23
GLOBE	L52E
GLOBE	AJ2-07
GLOOM	AS 8-09-2
GLOOM	2C24
GLOOM	L55C
GLOOM	AJ2-08

Table 6-1
SIGNAL INDEX

Code	Function
GNDCH	CHASSIS GROUND
GNDSG	SIGNAL GROUND
GOING	GROUND FOR 16 SECOND INTEGRATION TIME.
GORGE	GROUND FOR 32 SECOND INTEGRATION TIME.
GOURD	250 VOLT DC POWER FOR NIXIE TUBES
GRAPE	115 VOLT AC POWER
GRASS	DISABLES INTERNAL BAND NUMBER ADVANCE CIRCUITS TO PERMIT MANUAL BAND NUMBER ADVANCE
GRAVY	CONTROL SIGNAL. GROUNDING STOPS ALL OPERATIONS PERMANENTLY.
GREAT	115 VOLT AC POWER
GRIEF	115 VOLT AC POWER
GRILL	115 VOLT AC POWER
GRIND	250 VOLT DC POWER BETWEEN POWER SUPPLY AND FRONT PANEL SWITCH
GROOM	RETURN LINE FOR 250 VOLT DC NIXIE POWER
GROUP	RETURN LINE FOR 250 VOLT DC POWER FROM SWITCH TO POWER SUPPLY
GUEST	NIXIE ON-OFF CONTROL LINE
GUIDE	'INTEGRATING' PILOT LIGHT POWER
GUILT	ADVANCE COMMAND FOR NEXT MICROPHONE SUBSET
HABIT	RESUME COMMAND AFTER NEXT MICROPHONE SUBSET IS ENERGIZED
HANDY	REMOTE TRIGGERING OF START PULSE GENERATOR
HAPPY	PUNCH OR PRINT COMMAND
HARSH	PUNCH OR PRINT COMMAND
HASTE	COMMANDS ADVANCE TO NEXT BAND AFTER PUNCHING OR PRINTING
HEART	GROUND TO ENABLE REMOTE CONTROL OVER DISPLAY FUNCTIONS
HEATH	COMMANDS ADVANCE TO NEXT BAND AFTER PUNCHING OR PRINTING
HEAVY	BAND NUMBER, BCD, 40 WEIGHT
HEDGE	BAND NUMBER, BCD, 20 WEIGHT
HEFTY	BAND NUMBER, BCD, 10 WEIGHT
HENNA	BAND NUMBER, BCD, 8 WEIGHT
HERON	BAND NUMBER, BCD, 4 WEIGHT
HINGE	BAND NUMBER, BCD, 2 WEIGHT
HITCH	BAND NUMBER, BCD, 1 WEIGHT
HOIST	POWER FOR 'ON-OFF' PILOT LIGHT
HONEY	BLANKS BAND NUMBER WHEN CALIBRATION CHANNEL ANSWER IS DISPLAYED
HOTEL	MEMORY BUFFER EXPONENT OUTPUT, BINARY, 1 WEIGHT
HOUSE	MEMORY BUFFER EXPONENT OUTPUT, BINARY, 2 WEIGHT
HUMAN	MEMORY BUFFER EXPONENT OUTPUT, BINARY, 4 WEIGHT
HUNCH	MEMORY BUFFER EXPONENT OUTPUT, BINARY, 8 WEIGHT
HURRY	MEMORY BUFFER EXPONENT OUTPUT, BINARY, 16 WEIGHT
JETTY	LEVEL IN DB, BCD, 8 WEIGHT, NEGATIVE LOGIC
JEWEL	LEVEL IN DB, BCD, 4 WEIGHT, NEGATIVE LOGIC
JIFFY	LEVEL IN DB, BCD, 2 WEIGHT, NEGATIVE LOGIC
JOINT	LEVEL IN DB, BCD, 1 WEIGHT, NEGATIVE LOGIC
JUDGE	LEVEL IN DB, BCD, 800 WEIGHT, NEGATIVE LOGIC
JUROR	LEVEL IN DB, BCD, 100 WEIGHT, NEGATIVE LOGIC
KNAVE	LEVEL IN DB, BCD, 80 WEIGHT, NEGATIVE LOGIC
KNIFE	LEVEL IN DB, BCD, 40 WEIGHT, NEGATIVE LOGIC
KNOCK	LEVEL IN DB, BCD, 20 WEIGHT, NEGATIVE LOGIC
LABOR	LEVEL IN DB, BCD, 10 WEIGHT, NEGATIVE LOGIC
LADEN	LEVEL IN DB, BCD, 1/2 WEIGHT, NEGATIVE LOGIC
LANCE	LEVEL IN DB, BCD, 1/4 WEIGHT, NEGATIVE LOGIC
LANKY	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-13TH WEIGHT
LAPEL	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-12TH WEIGHT
LAPSE	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-11TH WEIGHT
LARGE	BUSY SIGNAL FOR COMPUTERS
LASSO	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-10TH WEIGHT
LEVEL	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-9TH WEIGHT
LIBEL	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-8TH WEIGHT
LINEN	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-7TH WEIGHT
LOBBY	MEMORY BUFFER MANTISSA OUTPUT, BINARY, 2-TO-THE-6TH WEIGHT
LOCUS	2 MHZ CLOCK PULSES, OPPOSITE PHASE FROM LODGE
LODGE	2 MHZ CLOCK PULSES, OPPOSITE PHASE FROM LOCUS
LOYAL	'DATA READY' SIGNAL TO COMPUTERS
LUCID	COMPUTER REPORT-BACK 'FINISHED ABSORBING DATA'
LUCKY	X-AXIS VOLTAGE FOR OSCILLOSCOPES
MACAW	BUFFERED PUNCH OR PRINT COMMAND
MADAM	BUFFERED PUNCH OR PRINT COMMAND
MAGIC	BUFFERED 'DATA READY FOR COMPUTER' SIGNAL
MAJOR	BUFFERED BUSY SIGNAL FOR COMPUTERS
MARCH	DB OUTPUT IN BCD, BUFFERED, 10 WEIGHT
MARRY	DB OUTPUT IN BCD, BUFFERED, 1/2 WEIGHT
MEATY	DB OUTPUT IN BCD, BUFFERED, 20 WEIGHT
MEDAL	DB OUTPUT IN BCD, BUFFERED, 1/4 WEIGHT
MEDIA	DB OUTPUT IN BCD, BUFFERED, 40 WEIGHT
MERCY	DB OUTPUT IN BCD, BUFFERED, 800 WEIGHT
MERGE	DB OUTPUT IN BCD, BUFFERED, 80 WEIGHT
MERIT	DB OUTPUT IN BCD, BUFFERED, 100 WEIGHT
MIDST	DB OUTPUT IN BCD, BUFFERED, 1 WEIGHT
MIN16	NEGATIVE 16 VOLT DC POWER
MIN10	NEGATIVE 10 VOLT DC POWER
MIN20	NEGATIVE 20 VOLT DC POWER
MINCE	DB OUTPUT IN BCD, BUFFERED, 8 WEIGHT
MINOR	BAND NUMBER OUTPUT IN BCD, BUFFERED, 8 WEIGHT
MIRTH	BAND NUMBER OUTPUT IN BCD, BUFFERED, 1 WEIGHT
MISER	BAND NUMBER OUTPUT IN BCD, BUFFERED, 20 WEIGHT
MISTY	BAND NUMBER OUTPUT IN BCD, BUFFERED, 40 WEIGHT
MIXED	BAND NUMBER OUTPUT IN BCD, BUFFERED, 2 WEIGHT
MODEL	BAND NUMBER OUTPUT IN BCD, BUFFERED, 4 WEIGHT
MOIST	BAND NUMBER OUTPUT IN BCD, BUFFERED, 10 WEIGHT
MOLAR	BUFFERED SIGNAL VOLTAGE, POSITIVE DURING INTEGRATE MODE
MONEY	BUFFERED COMMAND TO ADVANCE TO NEXT MICROPHONE SUBSET
MOOSE	Y-AXIS VOLTAGE FOR OSCILLOSCOPES
MOUNT	DB OUTPUT IN BCD, BUFFERED, 4 WEIGHT
MOURN	DB OUTPUT IN BCD, BUFFERED, 2 WEIGHT
MOUTH	SWITCHED CONNECTION FOR 'INTEGRATING' LIGHT
MUDDY	RETURN LINE FOR 'ON-OFF' PILOT LIGHT
MULCH	PRECISION 4.5 VOLT REFERENCE VOLTAGE
MUSIC	DUMP PULSE TO PURGE OLD SAMPLES FROM CONVERTER, SQUARER
NASTY	GROUND LINE FOR 'MAX LEVEL' SWITCH, 60-150 SIDE
NERVE	MAX LEVEL SWITCH OUTPUT, 80 WEIGHT
NIECE	GROUND LINE FOR 'MAX LEVEL' SWITCH, 0-9 SIDE
NIGHT	MAX LEVEL SWITCH OUTPUT, 40 WEIGHT

SIGNAL INTERCONNECTION CHART

Code	Routing
GOING	AS 8-10-2
GOING	2C25
GOING	L54C
GOING	AJ2-09
GORGE	AS 8-11-2
GORGE	2C50
GORGE	L53C
GORGE	AJ2-10
GOURD	AS 8-01-2
GOURD	U39
GRAPE	AS 1-06
GRAPE	U86
GRAPE	AT 1-04
GRASS	AS 4-108R
GRASS	2C11
GRASS	L36C
GRAVY	AS11-03-5
GRAVY	2C05
GRAVY	L35E
GRAVY	M57E
GRAVY	AJ2-02
GRAVY	AJ3-18
GREAT	AS 1-01
GREAT	U85
GREAT	AJ08-RIGHT
GRIEF	AS 1-02
GRIEF	U84
GRIEF	AJ08-LEFT
GRILL	AS 1-05
GRILL	U83
GRILL	AF 1-REAR
GRIND	AS 8-01-3
GRIND	U82
GRIND	AC 5=SQUARE+TRIANGLE
GROOM	AS 8-01-4
GROOM	U81
GROOM	AC 5=CASE
GROUP	AS 8-01-5
GROUP	U54
GUEST	U37
GUEST	2C10
GUEST	L40C
GUEST	AJ1-07
GUEST	AJ7-06
GUIDE	FRONT PANEL INTEGRATE LIGHT
GUIDE	U48
GUILT	M52C
GUILT	W40C
HABIT	M57C
HABIT	AJ3-16
HANDY	M49C
HANDY	AJ2-26
HAPPY	L07E
HAPPY	W07C
HARSH	L07C
HARSH	W08C
HASTE	L25C
HASTE	AJ1-09
HASTE	AJ4-19
HEART	AS10-06-5
HEART	1C34
HEART	L11C
HEART	T10C TIE POINT
HEART	AJ2-24
HEART	AJ4-20
HEATH	L09C
HEATH	AJ1-02
HEATH	AJ4-45
HEAVY	P31C
HEAVY	W32C
HEDGE	P29C
HEDGE	W31C
HEFTY	P35C
HEFTY	W35C
HENNA	P23C
HENNA	W29C
HERON	P34C
HERON	W34C
HINGE	P32C
HINGE	W33C
HITCH	P25C
HITCH	W30C
HOIST	FRONT PANEL POWER PILOT LIGHT
HOIST	U49
HONEY	U22
HONEY	1C47
HONEY	P53E
HONEY	T30C TIE POINT
HOTEL	K57E
HOTEL	S39C
HOUSE	K13C
HOUSE	S40C
HUMAN	K27E
HUMAN	S41C
HUNCH	K24E
HUNCH	S44C
HURRY	K13E
HURRY	S42C
JETTY	U30
JETTY	2C01
JETTY	T29E
JETTY	W20C
JEWEL	U29
JEWEL	1C46
JEWEL	T29C
JEWEL	W21C
JIFFY	U28
JIFFY	2C02
JIFFY	T30E
JIFFY	W22C
JOINT	U27
JOINT	1C41
JOINT	T20C
JOINT	W19C
JUDGE	U36
JUDGE	1C08
JUDGE	T14E
JUDGE	W16C
JUROR	U35
JUROR	1C13
JUROR	T17E
JUROR	W18C
KNAVE	U34
KNAVE	1C36
KNAVE	T14C
KNAVE	W17C
KNIFE	U33
KNIFE	1C06
KNIFE	T12E
KNIFE	W15C
KNOCK	U32
KNOCK	1C04
KNOCK	T10E
KNOCK	W13C
LABOR	U31
LABOR	1C02
LABOR	T08E
LABOR	W11C
LADEN	U26
LADEN	1C32
LADEN	T09C
LADEN	W12C
LANCE	U25
LANCE	1C35
LANCE	T11C
LANCE	W14C
LANKY	J50C
LANKY	S47C
LAPEL	J43C
LAPEL	S46C
LAPSE	J33C
LAPSE	S55C
LARGE	L12C
LARGE	W25C
LARGE	AJ4-46
LASSO	J29C
LASSO	S51C
LEVEL	J10C
LEVEL	S52C
LIBEL	J22C
LIBEL	S53C
LINEN	H19C
LINEN	S56C
LOBBY	H21C
LOBBY	S54C
LOCUS	G43E
LOCUS	M43C
LODGE	E09C
LODGE	G45E
LODGE	L49C
LODGE	M45C
LOYAL	L10C
LOYAL	W24C
LOYAL	AJ4-47
LUCID	L35C
LUCID	AJ4-18
LUCKY	L41C
LUCKY	AK1-07
LUCKY	AJ7-01
MACAW	W07E
MACAW	AJ1-10
MACAW	AJ4-43
MADAM	W08E
MADAM	AJ4-24
MAGIC	W24E
MAGIC	AJ4-44
MAJOR	W25E
MAJOR	AJ4-42
MARCH	W11E
MARCH	AJ4-07
MARRY	W12E
MARRY	AJ4-03
MARRY	AJ4-28
MEATY	W13E
MEATY	AJ4-08
MEDAL	W14E
MEDAL	AJ4-01
MEDAL	AJ4-04
MEDAL	AJ4-26
MEDIA	W15E
MEDIA	AJ4-32
MERCY	W16E
MERCY	AJ4-35
MERGE	W17E
MERGE	AJ4-33
MERIT	W18E
MERIT	AJ4-09
MIDST	W19E
MIDST	AJ4-05
MINCE	W20E
MINCE	AJ4-31
MINOR	W29E
MINOR	AJ4-39
MIRTH	W30E
MIRTH	AJ4-13
MISER	W31E
MISER	AJ4-16
MISTY	W32F
MISTY	AJ4-40
MIXED	W33F
MIXED	AJ4-14
MODEL	W34F
MODEL	AJ4-38
MOIST	W35E
MOIST	AJ4-15
MOLAR	W39E
MOLAR	AJ4-12
MONEY	W40E
MONEY	AJ3-04
MOOSE	W52E
MOOSE	AK1-08
MOOSE	AJ7-21
MOUNT	W21E
MOUNT	AJ4-30
MOURN	W22E
MOURN	AJ4-06
MOUTH	FRONT PANEL INTEGRATE LIGHT
MOUTH	U45
MUDDY	FRONT PANEL POWER PILOT LIGHT
MUDDY	U50
MULCH	C06C
MULCH	E28C
MULCH	W57C
MUSIC	E29C
MUSIC	G18E
NASTY	AS 7-01-C
NASTY	U73
NERVE	AS 7-01-8 OR 80
NERVE	U80
NIECE	AS 7-02-C
NIECE	U74
NIGHT	AS 7-01-4 OR 40
NIGHT	U40

Table 6-1
SIGNAL INDEX

Code	Function
NOBLE	MAX LEVEL SWITCH OUTPUT, 20 WEIGHT
NOISE	MAX LEVEL SWITCH OUTPUT, 10 WEIGHT
NOMAD	MAX LEVEL SWITCH OUTPUT, 1 WEIGHT
NOOSE	MAX LEVEL SWITCH OUTPUT, 2 WEIGHT
NOTCH	MAX LEVEL SWITCH OUTPUT, 4 WEIGHT
NUDGE	MAX LEVEL SWITCH OUTPUT, 8 WEIGHT
PADDY	NIXIE AND PEN LIFT CONTROL
PARCH	GROUND FOR 'LOWEST BAND NUMBER', 'HIGHEST BAND NUMBER' SWITCHES
PARKS	TURNS OFF MUX ADDRESS PRIOR TO TURNING ON NEXT ADDRESS
PARTY	COAXIAL CABLE SHIELD
PASTE	COAXIAL CABLE SHIELD
PAVED	REFERENCE VOLTAGE EQUAL TO SUPPLY VOLTAGE OF BUFFERED OUTPUT INTEGRATED CIRCUITS
PEACE	31ST DATA CHANNEL INPUT TO MULTIPLEXER
PEACH	32ND DATA CHANNEL INPUT TO MULTIPLEXER
PEARL	33RD DATA CHANNEL INPUT TO MULTIPLEXER
PEDAL	34TH DATA CHANNEL INPUT TO MULTIPLEXER
PENNY	35TH DATA CHANNEL INPUT TO MULTIPLEXER
PERCH	36TH DATA CHANNEL INPUT TO MULTIPLEXER
PERIL	37TH DATA CHANNEL INPUT TO MULTIPLEXER
PIANO	38TH DATA CHANNEL INPUT TO MULTIPLEXER
PILOT	39TH DATA CHANNEL INPUT TO MULTIPLEXER
PINCH	40TH DATA CHANNEL INPUT TO MULTIPLEXER
PITCH	41ST DATA CHANNEL INPUT TO MULTIPLEXER
PIVOT	42ND DATA CHANNEL INPUT TO MULTIPLEXER
PLACE	43RD DATA CHANNEL INPUT TO MULTIPLEXER
PLAIN	44TH DATA CHANNEL INPUT TO MULTIPLEXER
PLANT	45TH DATA CHANNEL INPUT TO MULTIPLEXER
PLO5B	POSITIVE 5 VOLT DC SUPPLY FOR BOARDS B, C, D, E ONLY
PLS20	POSITIVE 20 VOLT DC SUPPLY
PLS05	POSITIVE 5 VOLT DC SUPPLY FOR BOARDS EXCEPT B, C, D, E
RABID	CONTROL LINE. GROUND FOR CRO STORE-NO-ERASE DISPLAY.
RACES	CONTROL LINE. GROUND FOR CRO STORE-AND-ERASE DISPLAY.
RACKS	CONTROL LINE. GROUND TO USE PRINTER.
RAFTS	CONTROL LINE. GROUND FOR CRO NON-STORE DISPLAY.
RAGED	CONTROL LINE. GROUND TO USE XY PLOTTER.
RAIDS	RELAY ON-OFF CONTROL
RAINY	ERASE SIGNAL FOR STORAGE OSCILLOSCOPES
RAISE	CONTROL LINE. GROUND FOR 64 BANDS/SECOND DISPLAY.
RALLY	ON-OFF CONTROL FOR STORAGE OF STORAGE SCOPES
RANCH	PEN CONTROL FOR XY PLOTTERS
RANGE	CONTROL LINE. GROUND FOR 32 BANDS/SECOND DISPLAY.
RANKS	CONTROL LINE. GROUND FOR 16 BANDS/SECOND DISPLAY.
RAPID	CONTROL LINE. GROUND FOR 8 BANDS/SECOND DISPLAY.
RAVEN	CONTROL LINE. GROUND FOR 4 BANDS/SECOND DISPLAY.
RAYON	CONTROL LINE. GROUND FOR 2 BANDS/SECOND DISPLAY.
RAZOR	CONTROL LINE. GROUND FOR 1 BAND/SECOND DISPLAY.
REACH	'ADVANCE TO NEW PAGE' COMMAND FOR XY PLOTTERS
REACT	ENABLES 'DISPLAY RATE' SWITCH
REALM	ENABLES 'MANUAL ADVANCE' BUTTON THROUGH DISPLAY RATE SWITCH
REBEL	0 VOLTS DURING DISPLAY OF EACH OUTPUT BAND, +5 BETWEEN BANDS
RECAP	+5 V DURING DISPLAY OF EACH OUTPUT BAND, 0 VOLTS BETWEEN BANDS
RECUR	X-AXIS SIGNAL TO PLOTTERS
REFER	Y-AXIS SIGNAL TO PLOTTERS
RELIC	GROUND THIS LINE TO PAUSE. ALL OPERATIONS HALT TILL GROUND IS REMOVED.
RENEW	CONTROL SIGNAL TO ENABLE OPERATION WITH GR 1522 RECORDER
REPAY	MOTOR START PULSE TO GR 1522 RECORDER
RESIN	MOTOR STOP PULSE TO GR 1522 RECORDER
RHINO	RECOGNIZES POSITIONING OF NEW PAGE ON GR 1522 RECORDER
RHYME	RECOGNIZES POSITION OF NEXT BAND ON GR 1522 RECORDER
RICED	SETS FLIP-FLOP USED FOR MANUAL ADVANCE
RIDES	CLEARS FLIP-FLOP USED FOR MANUAL ADVANCE AND GENERATES 'NEXT BAND' COMMAND PULSE
RIFLE	SETS FLIP-FLOP USED FOR GENERATING COLDSTART PULSE
RIGOR	CLEARS FLIP-FLOP USED FOR GENERATING COLDSTART PULSE, AND CAUSES A NEW START PULSE TO BE GENERATED
TIME1	TIME 1 IN A SINGLE OPERATING SEQUENCE
TIME2	TIME 2 IN A SINGLE OPERATING SEQUENCE
TIME3	TIME 3 IN A SINGLE OPERATING SEQUENCE
TIME4	TIME 4 IN A SINGLE OPERATING SEQUENCE
TIME5	TIME 5 IN A SINGLE OPERATING SEQUENCE
TIME6	TIME 6 IN A SINGLE OPERATING SEQUENCE
TIME7	TIME 7 IN A SINGLE OPERATING SEQUENCE
TORUS	1ST DATA CHANNEL INPUT TO MULTIPLEXER
TOWER	2ND DATA CHANNEL INPUT TO MULTIPLEXER
TRACE	3RD DATA CHANNEL INPUT TO MULTIPLEXER
TRACK	4TH DATA CHANNEL INPUT TO MULTIPLEXER
TRADE	5TH DATA CHANNEL INPUT TO MULTIPLEXER
TRAIL	6TH DATA CHANNEL INPUT TO MULTIPLEXER
TRAIN	7TH DATA CHANNEL INPUT TO MULTIPLEXER
TRAIT	8TH DATA CHANNEL INPUT TO MULTIPLEXER
TRAWL	9TH DATA CHANNEL INPUT TO MULTIPLEXER
TREAT	10TH DATA CHANNEL INPUT TO MULTIPLEXER
TREND	11TH DATA CHANNEL INPUT TO MULTIPLEXER
TRIBE	12TH DATA CHANNEL INPUT TO MULTIPLEXER
TRICK	13TH DATA CHANNEL INPUT TO MULTIPLEXER
TRILL	14TH DATA CHANNEL INPUT TO MULTIPLEXER
TROLL	25TH DATA CHANNEL INPUT TO MULTIPLEXER
TROOP	15TH DATA CHANNEL INPUT TO MULTIPLEXER
TROUT	16TH DATA CHANNEL INPUT TO MULTIPLEXER
TRUCE	17TH DATA CHANNEL INPUT TO MULTIPLEXER
TRUCK	18TH DATA CHANNEL INPUT TO MULTIPLEXER
TRULY	19TH DATA CHANNEL INPUT TO MULTIPLEXER
TRUNK	26TH DATA CHANNEL INPUT TO MULTIPLEXER
TRUST	20TH DATA CHANNEL INPUT TO MULTIPLEXER
TRUTH	27TH DATA CHANNEL INPUT TO MULTIPLEXER
TULIP	21ST DATA CHANNEL INPUT TO MULTIPLEXER
TUNIC	22ND DATA CHANNEL INPUT TO MULTIPLEXER
TWAIN	23RD DATA CHANNEL INPUT TO MULTIPLEXER
TWANG	28TH DATA CHANNEL INPUT TO MULTIPLEXER
TWEAK	24TH DATA CHANNEL INPUT TO MULTIPLEXER
TWEED	29TH DATA CHANNEL INPUT TO MULTIPLEXER
TWILL	30TH DATA CHANNEL INPUT TO MULTIPLEXER
U46	TIE POINT FOR SERIES CONNECTED LAMPS
U47	TIE POINT FOR SERIES CONNECTED LAMPS
V02E	TO AQ6 BASE
V03E	TO AQ6 EMITTER
V04E	TO AC2 POSITIVE
V05E	TO AQ7 EMITTER
V06E	TO AC4 CASE
V07E	TO AQ3 BASE
V10E	TO AQ4 BASE
V11E	TO AQ1 EMITTER
V12E	TO AC1 CASE
V18E	TO AQ2 BASE
V20E	TO AC3 NEGATIVE
V21E	TO AQ2 EMITTER
V22E	TO AQ7 EMITTER
V23E	TO AQ7 BASE

SIGNAL-INTERCONNECTION CHART

Code	Routing	Code	Routing	Code	Routing	Code	Routing	Code	Routing
NOBLE	AS 7-01-2 OR 20	PERCH	AJ5-21	RAGED	T19C TIE POINT	REACT	AS10-04-5	TIME3	M12C NOTE 1.	TROUT	C45C
NOBLE	U20	PERIL	B17E	RAGED	AJ2-22	REACT	AS10-05-2	TIME4	H20C	TROUT	AJ5-01
NOISE	AS 7-01-1 OR 10	PERIL	AJ5-22	RAIDS	L29C	REALM	AS 4-111F	TIME4	J20C	TROUT	AJ6-16
NOISE	U10	PIANO	B18E	RAIDS	Q08E TIE POINT	REALM	AS10-07-5	TIME4	M31C	TRUCE	C46C
NOMAD	AS 7-02-1	PIANO	AJ5-23	RAIDS	AK1-02	REBEL	L39E	TIME5	M33C NOTE 1.	TRUCE	AJ5-02
NOMAD	U01	PILOT	B19E	RAINY	L27E	REBEL	AJ4-36	TIME6	L26E	TRUCE	AJ6-17
NOOSE	AS 7-02-2	PILOT	AJ5-24	RAINY	AJ7-23	RECAP	L38E	TIME6	M30C	TRUCK	C47C
NOOSE	U02	PINCH	B20E	RAISE	AS 4-106F	RECAP	AJ4-11	TIME7	M32C	TRUCK	AJ5-03
NOTCH	AS 7-02-4	PINCH	AJ5-25	RAISE	1C28	RECUR	AK1-06	TIME7	P51C	TRUCK	AJ6-18
NOTCH	U04	PITCH	B16C	RAISE	L08E	RECUR	AJ1-01	TORUS	C16E	TRULY	C48C
NUDGE	AS 7-02-8	PITCH	AJ5-26	RAISE	T06F TIE POINT	RECUR	AJ10 CENTER	TORUS	AJ6-01	TRULY	AJ5-04
NUDGE	U08	PIVOT	B17C	RALLY	L30E	REFER	AK1-05	TOWER	C15C	TRULY	AJ6-19
PADDY	L51E	PIVOT	AJ5-27	RALLY	AJ7-05	REFER	AJ1-15	TOWER	AJ6-02	TRUNK	C50E
PADDY	AJ1-19	PLACE	B18C	RANCH	L31E	REFER	AJ11 CENTER	TRACE	C15E	TRUNK	AJ5-11
PADDY	AJ3-07	PLACE	AJ5-28	RANCH	AJ1-20	RELIC	AS11-02-5	TRACE	AJ6-03	TRUNK	AJ6-26
PADDY	AJ7-24	PLAIN	B19C	RANGE	AS 4-105F	RELIC	2C08	TRACK	C14E	TRUST	C49C
PARCH	AS 5-01-C	PLAIN	AJ5-29	RANGE	1C27	RELIC	M38E	TRACK	AJ6-04	TRUST	AJ5-05
PARCH	AS 5-02-C	PLANT	B20C	RANGE	L09E	RELIC	AJ2-44	TRADE	C13E	TRUST	AJ6-20
PARCH	AS 6-01-C	PLANT	AJ5-30 TIE POINT	RANGE	T06C TIE POINT	RENEW	L38C	TRADE	AJ6-05	TRUTH	C51E
PARCH	AS 6-02-C	RABID	AS10-02-5	RANKS	AS 4-104F	RENEW	AJ1-14	TRAIL	C12E	TRUTH	AJ5-12
PARCH	U54	RABID	1C39	RANKS	1C30	REPAY	L43C	TRAIL	AJ6-06	TRUTH	AJ6-27
PARKS	M30E	RABID	L18E	RANKS	L10E	REPAY	AJ1-18	TRAIN	C17E	TULIP	C45E
PARKS	P37E	RABID	T18C	RANKS	T07E TIE POINT	RESIN	L44C	TRAIN	AJ6-07	TULIP	AJ5-06
PARTY	SHIELD FROM COAX GOING TO AK1-8, GROUND NEAR W52E	RABID	AJ2-20 TIE POINT	RAPID	AS 4-103F	RESIN	AJ1-06	TRAIT	C18E	TULIP	AJ6-21
		RACES	AS10-01-5	RAPID	1C31	RHINO	L47C	TRAIT	AJ6-08	TUNIC	C46E
		RACES	1C42	RAPID	L12E	RHINO	AJ1-05	TRAWL	C19E	TUNIC	AJ5-07
PASTE	SHIELD FROM COAX GOING TO AK1-7, GROUND NEAR L41C	RACES	L17E	RAPID	T08C TIE POINT	RHYME	L57C	TRAWL	AJ6-09	TUNIC	AJ6-22
		RACES	T18E	RAVEN	AS 4-102F	RHYME	AJ1-17	TREAT	C20E	TWAIN	C47E
		RACES	AJ2-19 TIE POINT	RAVEN	1C33	RICED	AS10-07-4	TREAT	AJ6-10	TWAIN	AJ5-08
PAVED	W36E	RACKS	AS10-05-5	RAVEN	L11E	RICED	2C13	TREND	C16C	TWAIN	AJ6-23
PAVED	AJ4-49	RACKS	1C44	RAVEN	T09E TIE POINT	RICED	L08C	TREND	AJ6-11	TWANG	C52E
PEACE	B16E	RACKS	L21C	RAYON	AS 4-101F	RIDES	AS10-07-6	TRIBE	C17C	TWANG	AJ5-13
PEACE	AJ5-16	RACKS	T20E	RAYON	1C37	RIDES	2C28	TRIBE	AJ6-12	TWANG	AJ6-28
PEACH	B15C	RACKS	AJ2-23	RAYON	L13E	RIDES	L20C	TRICK	C18C	TWEAK	C48E
PEACH	AJ5-17	RAFTS	AS10-03-5	RAYON	T13E TIE POINT	RIFLE	AS11-01-4	TRICK	AJ6-13	TWEAK	AJ5-09
PEARL	B15E	RAFTS	1C43	RAZOR	AS 4-112F	RIFLE	2C14	TRILL	C19C	TWEAK	AJ6-24
PEARL	AJ5-18	RAFTS	L19E	RAZOR	1C38	RIFLE	M48C	TRILL	AJ6-14	TWEED	C53E
PEDAL	B14E	RAFTS	T19E TIE POINT	RAZOR	L14E	RIGOR	AS11-01-6	TROLL	C49E	TWEED	AJ5-14
PEDAL	AJ5-19	RAFTS	AJ2-21	RAZOR	T17C TIE POINT	RIGOR	2C29	TROLL	AJ5-10	TWEED	AJ6-29
PENNY	B13E	RAGED	AS10-04-2	REACH	L24C	RIGOR	M50E	TROLL	AJ6-25	TWILL	C53C
PENNY	AJ5-20	RAGED	1C40	REACH	AJ1-08	TIME1	M13C NOTE 1.	TROOP	C20C	TWILL	AJ5-15
PERCH	B12E	RAGED	L20E	REACT	AS 4-107F	TIME2	M17C NOTE 1.	TROOP	AJ6-15	TWILL	AJ6-30

FEDERAL MANUFACTURER'S CODE

From Federal Supply Code for Manufacturers Cataloging Handbooks H4-1 (Name to Code) and H4-2 (Code to Name) as supplemented through August, 1968.

Code	Manufacturer
00192	Jones Mfg. Co, Chicago, Illinois
00194	Walsco Electronics Corp, L.A., Calif.
00434	Schweber Electronics, Westburg, L.I., N.Y.
00656	Aerovox Corp, New Bedford, Mass.
01009	Alden Products Co, Brockton, Mass.
01121	Allen-Bradley, Co, Milwaukee, Wisc.
01295	Texas Instruments, Inc, Dallas, Texas
02114	Ferroxcube Corp, Saugerties, N.Y. 12477
02606	Fenwal Lab Inc, Morton Grove, Ill.
02660	Amphenol Electron Corp, Broadview, Ill.
02768	Fastex, Des Plaines, Ill. 60016
03508	G.E. Semicon Prod, Syracuse, N.Y. 13201
03636	Grayburne, Yonkers, N.Y. 10701
03888	Pyrofilm Resistor Co, Cedar Knolls, N.J.
03911	Clairex Corp, New York, N.Y. 10001
04009	Arrow-Hart & Hegeman, Hartford, Conn. 06106
04713	Motorola, Phoenix, Ariz. 85008
05170	Engr'd Electronics, Santa Ana, Calif. 92702
05624	Barber-Colman Co, Rockford, Ill. 61101
05820	Wakefield Eng, Inc, Wakefield, Mass. 01880
07126	Digitron Co, Pasadena, Calif.
07127	Eagle Signal (E.W. Bliss Co), Baraboo, Wisc.
07261	Avnet Corp, Culver City, Calif. 90230
07263	Fairchild Camera, Mountain View, Calif.
07387	Birtcher Corp, No. Los Angeles, Calif.
07595	Amer Semicond, Arlington Hts, Ill. 60004
07828	Bodine Corp, Bridgeport, Conn. 06605
07829	Bodine Electric Co, Chicago, Ill. 60618
07910	Cont Device Corp, Hawthorne, Calif.
07983	State Labs Inc, N.Y., N.Y. 10003
07999	Borg Inst., Delavan, Wisc. 53115
08730	Vemaline Prod Co, Franklin Lakes, N.J.
09213	G.E. Semiconductor, Buffalo, N.Y.
09408	Star-Tronics Inc, Georgetown, Mass. 01830
09823	Burgess Battery Co, Freeport, Ill.
09922	Burndy Corp, Norwalk, Conn. 06852
11236	C.T.S. of Berne, Inc, Berne, Ind. 46711
11599	Chandler Evans Corp, W. Hartford, Conn.
12040	National Semiconductor, Danbury, Conn.
12498	Crystalonics, Cambridge, Mass. 02140
12672	RCA, Woodbridge, N.J.
12697	Clarostat Mfg Co, Inc, Dover, N.H. 03820
12954	Dickson Electronics, Scottsdale, Ariz.
13327	Solitron Devices, Tappan, N.Y. 10983
14433	ITT Semicondictors, W.Palm Beach, Fla.
14655	Cornell-Dubilier Electric Co, Newark, N.J.
14674	Corning Glass Works, Corning, N.Y.
14936	General Instrument Corp, Hicksville, N.Y.
15238	ITT, Semiconductor Div, Lawrence, Mass.
15605	Cutler-Hammer Inc, Milwaukee, Wisc. 53233
16037	Spruce Pine Mica Co, Spruce Pine, N.C.
17771	Singer Co, Diehl Div, Somerville, N.J.
19396	Illinois Tool Works, Pakton Div, Chicago, Ill.
19644	LRC Electronics, Horseheads, N.Y.
19701	Electra Mfg Co, Independence, Kansas 67301
21335	Fafnir Bearing Co, New Briton, Conn.
22753	UID Electronics Corp, Hollywood, Fla.
23342	Avnet Electronics Corp, Franklin Park, Ill.
24446	G.E., Schenectady, N.Y. 12305
24454	G.E., Electronics Comp, Syracuse, N.Y.
24455	G.E. (Lamp Div), Nela Park, Cleveland, Ohio
24655	General Radio Co, W. Concord, Mass. 01781
26806	American Zettlet Inc, Costa Mesa, Calif.
28520	Hayman Mfg Co, Kenilworth, N.J.
28959	Hoffman Electronics Corp, El Monte, Calif.
30874	I.B.M, Armonk, New York
32001	Jensen Mfg. Co, Chicago, Ill. 60638
33173	G.E. Comp, Owensboro, Ky. 42301
35929	Constanta Co, Mont. 19, Que.
37942	P.R. Mallory & Co Inc, Indianapolis, Ind.
38443	Marlin-Rockwell Corp, Jamestown, N.Y.
40931	Honeywell Inc, Minneapolis, Minn. 55408
42190	Muter Co, Chicago, Ill. 60638
42498	National Co, Inc, Melrose, Mass. 02176
43991	Norma-Hoffman, Stanford, Conn. 06904
49671	RCA, New York, N.Y. 10020
49956	Raytheon Mfg Co, Waltham, Mass. 02154
53021	Sangamo Electric Co, Springfield, Ill. 62705
54294	Shallcross Mfg Co, Selma, N.C.
54715	Shure Brothers, Inc, Evanston, Ill.
56289	Sprague Electric Co, N. Adams, Mass.
59730	Thomas and Betts Co, Elizabeth, N.J. 07207
59875	TRW Inc, (Accessories Div), Cleveland, Ohio
60399	Torrington Mfg Co, Torrington, Conn.
61637	Union Carbide Corp, New York, N.Y. 10017
61864	United-Carr Fastener Corp, Boston, Mass.
63060	Victoreen Instrument Co, Inc, Cleveland, O.
63743	Ward Leonard Electric Co, Mt. Vernon, N.Y.
65083	Westinghouse (Lamp Div), Bloomfield, N.J.
65092	Weston Instruments, Newark, N.J.
70485	Atlantic-India Rubber, Chicago, Ill. 60607
70563	Amperite Co, Union City, N.J. 07087
70903	Belden Mfg Co, Chicago, Ill. 60644
71126	Bronson, Homer D, Co, Beacon Falls, Conn.
71294	Canfield, H.O. Co, Clifton Forge, Va. 24422
71400	Bussman (McGraw Edison), St. Louis, Mo.
71468	ITT Cannon Elec, L.A., Calif. 90031
71590	Centralab, Inc, Milwaukee, Wisc. 53212
71666	Continental Carbon Co, Inc, New York, N.Y.
71707	Coto Coil Co Inc, Providence, R.I.
71744	Chicago Miniature Lamp Works, Chicago, Ill.
71785	Cinch Mfg Co, Chicago, Ill. 60624
71823	Darnell Corp, Ltd, Downey, Calif. 90241
72136	Electro Motive Mfg Co, Wilmington, Conn.
72259	Nytronics Inc, Berkeley Heights, N.J. 07922
72619	Dialight Co, Brooklyn, N.Y. 11237
72699	General Instr Corp, Newark, N.J. 07104
72765	Drake Mfg Co, Chicago, Ill. 60656
72825	Hugh H. Eby Inc, Philadelphia, Penn. 19144
72962	Elastic Stop Nut Corp, Union, N.J. 07083
72982	Erie Technological Products Inc, Erie, Penn.
73138	Beckman Inc, Fullerton, Calif. 92634
73445	Amperex Electronics Co, Hicksville, N.Y.
73559	Carling Electric Co, W.Hartford, Conn.
73690	Elco Resistor Co, New York, N.Y.
73899	JFD Electronics Corp, Brooklyn, N.Y.
74193	Heinemann Electric Co, Trenton, N.J.
74861	Industrial Condenser Corp, Chicago, Ill.
74970	E.F. Johnson Co, Waseca, Minn. 56093
75042	IRC Inc, Philadelphia, Penn. 19108
75382	Kulka Electric Corp, Mt. Vernon, N.Y.
75491	Lafayette Industrial Electronics, Jamica, N.Y.
75608	Linden and Co, Providence, R.I.
75915	Littelfuse, Inc, Des Plaines, Ill. 60016
76005	Lord Mfg Co, Erie, Penn. 16512
76149	Mallory Electric Corp, Detroit, Mich. 48204
76487	James Millen Mfg Co, Malden, Mass. 02148
76545	Mueller Electric Co, Cleveland, Ohio 44114
76684	National Tube Co, Pittsburg, Penn.
76854	Oak Mfg Co, Crystal Lake, Ill.
77147	Patton MacGuyer Co, Providence, R.I.
77166	Pass-Seymour, Syracuse, N.Y.
77263	Pierce Roberts Rubber Co, Trenton, N.J.
77339	Positive Lockwasher Co, Newark, N.J.
77542	Ray-O-Vac Co, Madison, Wisc.
77630	TRW, Electronic Comp, Camden, N.J. 08103
77638	General Instruments Corp, Brooklyn, N.Y.
78189	Shakeproof (Ill. Tool Works), Elgin, Ill. 60120
78277	Sigma Instruments Inc, S.Braintree, Mass.
78488	Stackpole Carbon Co, St. Marys, Penn.
78553	Tinnerman Products, Inc, Cleveland, Ohio
79089	RCA, Rec Tube & Semicond, Harrison, N.J.
79725	Wiremold Co, Hartford, Conn. 06110
79963	Zierick Mfg Co, New Rochelle, N.Y.
80030	Prestole Fastener, Toledo, Ohio
80048	Vickers Inc, St. Louis, Mo.
80131	Electronic Industries Assoc, Washington, D.C.
80183	Sprague Products Co, No. Adams, Mass.
80211	Motorola Inc, Franklin Park, Ill. 60131
80258	Standard Oil Co, Lafeyette, Ind.
80294	Bourns Inc, Riverside, Calif. 92506
80431	Air Filter Corp, Milwaukee, Wisc. 53218
80583	Hammarlund Co, Inc, New York, N.Y.
80740	Beckman Instruments, Inc, Fullerton, Calif.
81030	International Insturment, Orange, Conn.
81073	Grayhill Inc, LaGrange, Ill. 60525
81143	Isolantite Mfg Corp, Stirling, N.J. 07980
81349	Military Specifications
81350	Joint Army-Navy Specifications
81751	Columbus Electronics Corp, Yonkers, N.Y.
81831	Filtron Co, Flushing, L.I., N.Y. 11354
81840	Ledex Inc, Dayton, Ohio 45402
81860	Barry-Wright Corp, Watertown, Mass.
82219	Sylvania Elec Prod, Emporium, Penn.
82273	Indiana Pattern & Model Works, LaPort, Ind.
82389	Switchcraft Inc, Chicago, Ill. 60630
82647	Metals & Controls Inc, Attleboro, Mass.
82807	Milwaukee Resistor Co, Milwaukee, Wisc.
83033	Meissner Mfg, (Maguire Ind) Mt. Carmel, Ill.
83058	Carr Fastener Co, Cambridge, Mass.
83186	Victory Engineering, Springfield, N.J. 07081
83361	Bearing Specialty Co, San Francisco, Calif.
83587	Solar Electric Corp, Warren, Penn.
83740	Union Carbide Corp, New York, N.Y. 10017
83781	National Electronics Inc, Geneva, Ill.
84411	TRW Capacitor Div, Ogallala, Nebr.
84835	Lehigh Metal Prods, Cambridge, Mass. 02140
84971	TA Mfg Corp, Los Angeles, Calif.
86577	Precision Metal Prods, Stoneham, Mass. 02180
86684	RCA (Elect. Comp & Dev), Harrison, N.J.
86687	REC Corp, New Rochelle, N.Y. 10801
86800	Cont Electronics Corp, Brooklyn, N.Y. 11222
88140	Cutler-Hammer Inc, Lincoln, Ill.
88219	Gould Nat. Batteries Inc, Trenton, N.J.
88419	Cornell-Dubilier, Fuquay-Varina, N.C.
88627	K & G Mfg Co, New York, N.Y.
89482	Holtzer-Cabot Corp, Boston, Mass.
89665	United Transformer Co, Chicago, Ill.
90201	Mallory Capacitor Co, Indianapolis, Ind.
90750	Westinghouse Electric Corp, Boston, Mass.
90952	Hardware Products Co, Reading, Penn. 19602
91032	Continental Wire Corp, York, Penn. 17405
91146	ITT (Cannon Electric Inc), Salem, Mass.
91293	Johanson Mfg Co, Boonton, N.J. 07005
91506	Augat Inc, Attleboro, Mass. 02703
91598	Chandler Co, Wethersfield, Conn. 06109
91637	Dale Electronics Inc, Columbus, Nebr.
91662	Elco Corp, Willow Grove, Penn.
91719	General Instruments, Inc, Dallas, Texas
91929	Honeywell Inc, Freeport, Ill.
92519	Electra Insul Corp, Woodside, L.I., N.Y.
92678	E.G.&G., Boston, Mass.
93332	Sylvania Elect Prods, Inc, Woburn, Mass.
93916	Cramer Products Co, New York, N.Y. 10013
94144	Raytheon Co, Components Div, Quincy, Mass.
94154	Tung Sol Electric Inc, Newark, N.J.
95076	Garde Mfg Co, Cumberland, R.I.
95121	Quality Components Inc, St. Mary's, Penn.
95146	Alco Electronics Mfg Co, Lawrence, Mass.
95238	Continental Connector Corp, Woodside, N.Y.
95275	Vitramon, Inc, Bridgeport, Conn.
95354	Methode Mfg Co, Chicago, Ill.
95412	General Electric Co, Schenectady, N.Y.
95794	Anaconda Amer Brass Co, Torrington, Conn.
96095	Hi-Q Div. of Aerovox Corp, Orlean, N.Y.
96214	Texas Instruments Inc, Dallas, Texas 75209
96256	Thordarson-Meissner, Mt. Carmel, Ill.
96341	Microwave Associates Inc, Burlington, Mass.
96791	Amphenol Corp, Jonesville, Wisc. 53545
96906	Military Standards
98291	Sealectro Corp, Mamaroneck, N.Y. 10544
98474	Compar Inc, Burlingame, Calif.
98821	North Hills Electronics Inc, Glen Cove, N.Y.
99180	Transitron Electronics Corp, Melrose, Mass.
99313	Varian, Palo Alto, Calif. 94303
99378	Atlee Corp, Winchester, Mass. 01890
99800	Delevan Electronics Corp, E. Aurora, N.Y.

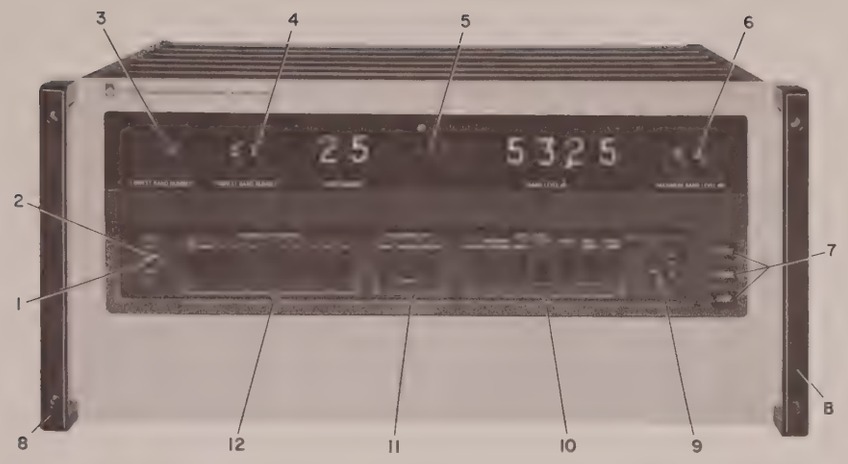


Figure 6-1. Front-panel mechanical parts.

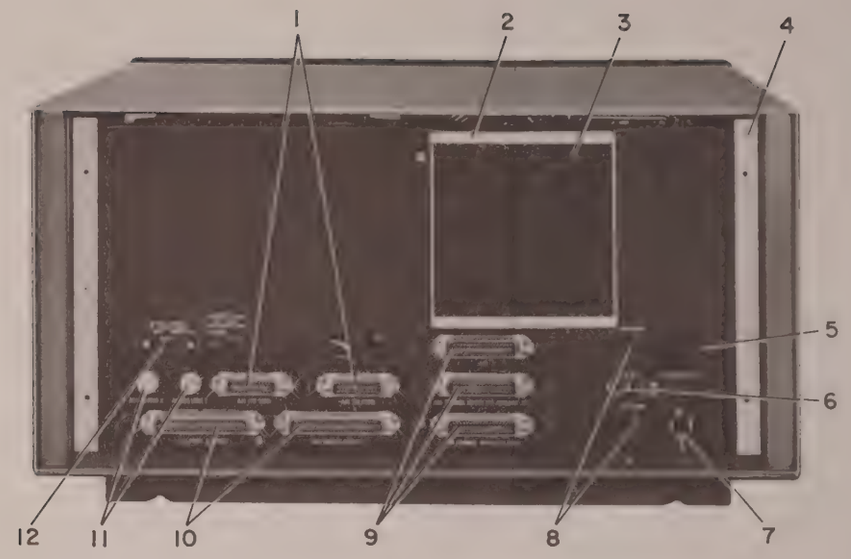


Figure 6-2. Rear-panel mechanical parts.

MECHANICAL PARTS LIST

Qnt	Ref No.	Name	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
1	1.	Switch asm.	Toggle switch, AS1, Power ON/OFF	7910-1300	04009	83053-SA	5930-909-3510
1	2.	Dress nut	Dress nut, 15/32-32, 7/16	5800-0800	24655	5800-0800	5310-344-3634
1	3.	Switch	Thumbwheel switch, AS5, LOWEST BAND NUMBER	7917-1008	07126	3G-480	
1	4.	Switch	Thumbwheel switch, AS6, HIGHEST BAND NUMBER	7917-1006	07126	3G-405	
1	6.	Switch	Thumbwheel switch, AS7, MAXIMUM BAND LEVEL dB	7917-1007	07126	3G-406	
1	5.	Window asm.	Window asm.	1926-7001	24655	1926-7001	
1	7.	Switch	Pushbutton switch, AS11, START, PAUSE, STOP; requires pushbutton marked, START, 1926-0400; PAUSE, 1926-0401; STOP, 1926-0402.	7880-2090	71590	PB15	
2	8.	Handle	Handle	5360-2022	24655	5360-2022	
1	9.	Knob gsm.	Knob asm., DISPLAY RATE - BANDS PER SECOND, including retainer 5220-5403	5500-5127	24655	5500-5127	
1	10.	Switch	Pushbutton switch, AS10 OUTPUT DISPLAY, requires pushbuttons 1926-5989	7880-2095	71590	PB-15	
1	11.	Switch	Pushbutton switch, AS9, MEASUREMENT MODE, requires pushbuttons 1926-5989	7880-2085	71590	PB-15	
1	12.	Switch	Pushbutton switch, AS8, INTEGRATION TIME-SECONDS, requires pushbuttons 1926-5989	7880-2080	71590	PB10	

MECHANICAL PARTS LIST (cont)

Qnt	Ref No.	Name	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
2	1.	Multiple Socket	Multiple socket, AJ1 (TO 1522), and AJ3 (TO 1566)	4230-4024	93916	57-40240	
1	2.	Filter holder asm.	Filter holder asm.	5390-5066	24655	5390-5066	
1	3.	Filter	Filter, air, polyurethane foam, charcoal gray, 4-15/16 X 4-3/4	5270-4509	24655	5270-4509	
1	4.	Cover asm.	Rear cover asm.	4171-1926	24655	4171-1926	
1	5.	Power receptacle	Power receptacle, AJ12, SWITCHED POWER	4250-0600	24655	4250-0600	
1	6.	Switch	Slide switch, AS2, LINE VOLTAGE REGULATOR	7910-0831	42190	4603	
1	7.	Power plug	Multiple plug, AJ8	4240-0600	24655	4240-0600	5935-816-0254
2	8.	Fuseholder	Fuse mounting device	5650-0100	71400	HKP-H	5920-284-7144
3	9.	Multiple socket	Multiple socket, AJ7; AJ5 CHANNEL INPUTS (TO AUXILIARY 1925); AJ6, CHANNEL INPUTS (TO 1925)	4230-4036	93916	57-40360	
2	10.	Multiple socket	Multiple socket, AJ4, DIGITAL OUTPUT; AJ2, PANEL CONTROLS.	4230-4049	93916	57-40500	5935-062-1776
2	11.	Connector	BNC Connector, AJ10 and AJ11	4230-2301	09408	UG-1094A/U	
1	12.	Switch	Slide switch, AS3, CHASSIS CONNECTED TO CIRCUIT GROUND, DIRECT-THROUGH 10 Ω	7910-0770	76854	#77	5930-574-2587

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Electrolytic, 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C2	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C3	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C4	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C5	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C6	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C7	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C8	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C9	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C10	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C11	Electrolytic 47µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C12	Electrolytic, 47µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C13	Electrolytic, 47µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C14	Electrolytic, 47µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C15	Electrolytic, 47µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C16	Electrolytic, 2.2µF ±20% 20 V	4450-4500	56289	150D225X0020A2	5910-976-4604
C17	Electrolytic 6.8µF ±20% 6 V	4450-4800	56289	150D685X0010A2	5910-936-1332
INTEGRATED CIRCUITS					
IC1	Type 946	5431-9462	07263	DTµL-946	
IC2	Type 946	5431-9462	07263	DTµL-946	
IC3	Type 946	5431-9462	07263	DTµL-946	
IC4	Type 946	5431-9462	07263	DTµL-946	
RESISTORS					
R1	Composition 6.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R2	Composition 3.9 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R3	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R4	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R5	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R6	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R7	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R8	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R9	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R10	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R11	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R12	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R13	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R14	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R15	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R16	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R17	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R18	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R19	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R20	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R21	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R22	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R23	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R24	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R25	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R26	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R27	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5.1 kΩ ±5%	5905-279-4623
R28	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ	5905-686-3358
R29	Composition 5.1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 39 kΩ ±5%	5905-279-4623
R30	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 5.1 kΩ ±5%	5905-279-4623

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
TRANSISTORS					
Q1	Type 2N4125	8210-1125	93916	2N4125	
Q2	Type MEM-511C	8210-1188	14936	MEM-511C	
Q3	Type 2N4125	8210-1125	93916	2N4125	
Q4	Type MEM-511C	8210-1188	14936	MEM-511C	
Q5	Type 2N4125	8210-1125	93916	2N4125	
Q6	Type MEM-511C	8210-1188	14936	MEM-511C	
Q7	Type 2N4125	8210-1125	93916	2N4125	
Q8	Type MEM-511C	8210-1188	14936	MEM-511C	
Q9	Type 2N4125	8210-1125	93916	2N4125	
Q10	MEM-511C	8210-1188	14936	MEM-511C	
Q11	Type 2N4125	8210-1125	93916	2N4125	
Q12	Type MEM-511C	8210-1188	14936	MEM-511C	
Q13	Type 2N4125	8210-1125	93916	2N4125	
Q14	Type MEM-511C	8210-1188	14936	MEM-511C	
Q15	Type 2N4125	8210-1125	93916	2N4125	
Q16	Type MEM-511C	8210-1188	14936	MEM-511C	
Q17	Type 2N4125	8210-1125	93916	2N4125	
Q18	Type MEM-511C	8210-1188	14936	MEM-511C	
Q19	Type 2N4125	8210-1125	93916	2N4125	
Q20	Type MEM-511C	8210-1188	14936	MEM-511C	
Q21	Type 2N4125	8210-1125	93916	2N4125	
Q22	Type MEM-511C	8210-1188	14936	MEM-511C	
Q23	Type 2N4125	8210-1125	93916	2N4125	
Q24	Type MEM-511C	8210-1188	14936	MEM-511C	
Q25	Type 2N4125	8210-1125	93916	2N4125	
Q26	Type MEM-511C	8210-1188	14936	MEM-511C	
Q27	Type 2N4125	8210-1125	93916	2N4125	
Q28	Type MEM-511C	8210-1188	14936	MEM-511C	
Q29	Type 2N4125	8210-1125	93916	2N4125	
Q30	Type MEM-511C	8210-1188	14936	MEM-511C	

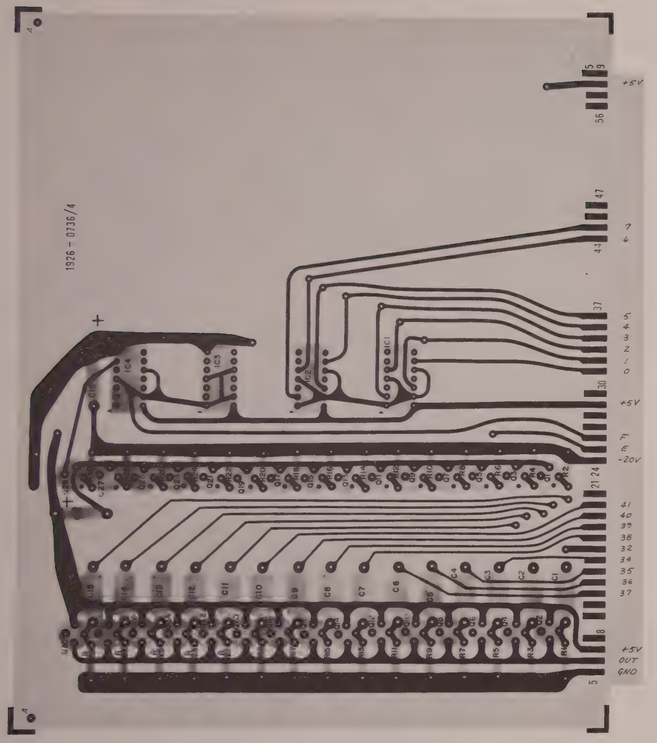
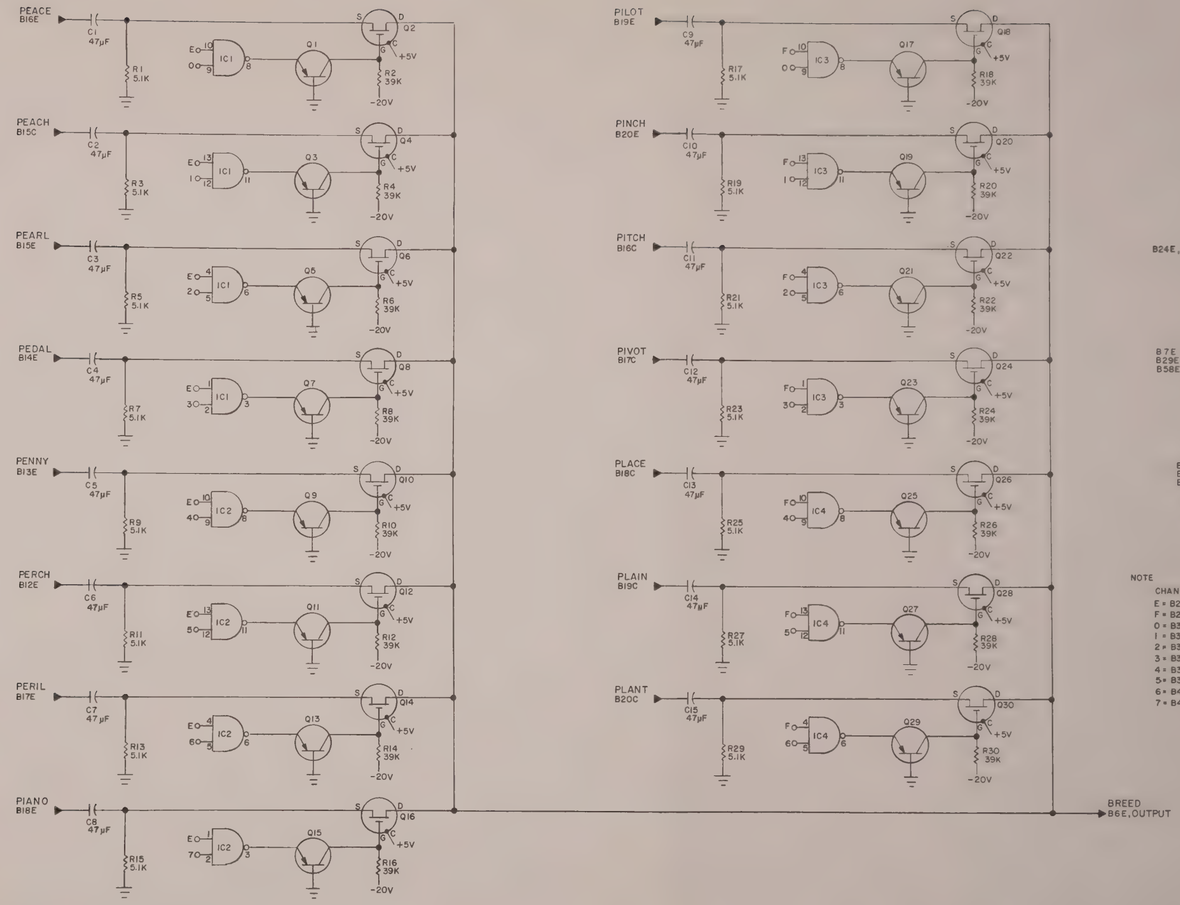


Figure 6-3. Etched-board assembly for 15-channel multiplexer (board B). Complete board is P/N 1926-4736.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.



NOTE UNLESS SPECIFIED

1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE.
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK.
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/4 WATT.
5. RESISTANCE IN OHMS K = 1000 OHMS M = 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS. LESS THAN ONE IN MICROFARADS.
7. KNOB CONTROL
8. SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT

NOTE

CHANNEL ADDRESS	
E = B25E	FLING
F = B26E	FLIRT
0 = B32E	FEAST
1 = B33E	FETCH
2 = B34E	FIGHT
3 = B35E	FEVER
4 = B36E	FIBER
5 = B37E	FIELD
6 = B44E	FILMY
7 = B45E	FINCH

TRANSISTOR BOTTOM VIEW

ALL ODD NUMBERED TRANSISTORS Q1 THRU Q29

ALL EVEN NUMBERED TRANSISTORS Q2 THRU Q30

INTEGRATED CIRCUIT BOTTOM VIEW

IC1 THRU IC4

CONNECTOR PINS: E = ETCHED SIDE C = CONNECTOR SIDE

CONNECTIONS: OUTPUT LEAVES SUBASSEMBLY; INPUT FROM DIFFERENT SUBASSEMBLY

Figure 6-4. Schematic diagram of the 15-channel multiplexer.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C2	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C3	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C4	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C5	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C6	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C7	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C8	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C9	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C10	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C11	Electrolytic 47 µF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C12	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C13	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C14	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C15	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C16	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C17	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C18	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C19	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C20	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C21	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C22	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C23	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C24	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C25	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C26	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C27	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C28	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C29	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C30	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C31	Electrolytic, 47 µF ±20% 6 V	4450-5500	56289	150D476X006B2	5910-752-4185
C33	Electrolytic, 2.2 µF ±20% 20 V	4450-5800	56289	150D225X0020A2	5910-976-4604
C34	Electrolytic, 6.8 µF ±20% 6 V	4450-5500	56289	150D685X0010A2	5910-936-1332
C35	Electrolytic, 6.8 µF ±20% 6 V	4450-4800	56289	150D685X0010A2	5910-936-1332
C37	Electrolytic, 0.1 µF ±20% 25 V	4400-2050	80183	5C13, 0.1 µF ±20%	5910-974-5695
INTEGRATED CIRCUITS					
IC1	Type 946	5431-9462	07263	DTµL-946	
IC2	Type 946	5431-9462	07263	DTµL-946	
IC3	Type 946	5431-9462	07263	DTµL-946	
IC4	Type 946	5431-9462	07263	DTµL-946	
IC5	Type 946	5431-9462	07263	DTµL-946	
IC6	Type 946	5431-9462	07263	DTµL-946	
IC7	Type 946	5431-9462	07263	DTµL-946	
IC8	Type 946	5431-9462	07263	DTµL-946	
RESISTORS					
R1	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R2	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R3	Film 6,6 kΩ ±1/4% 1/8 W	6252-1606	75042	CEATO, 6,6 kΩ ±1/4%	
R4	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R5	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R6	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R7	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R8	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R9	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R10	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R11	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R12	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R13	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R14	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R15	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R16	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R17	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R18	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R19	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R20	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R21	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R22	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R23	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R24	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R25	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R26	Composition 39 k Ω ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R27	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R28	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R29	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R30	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R31	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R32	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R33	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R34	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R35	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R36	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R37	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R38	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R39	Composition 5,1 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R40	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R41	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R42	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R43	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R44	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R45	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R46	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R47	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R48	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R49	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R50	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R51	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R52	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R53	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R54	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R55	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R56	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R57	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R58	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R59	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R60	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R61	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R62	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R63	Composition 5,1 kΩ ±5% 1/4 W	6099-2515	75042	BTS, 5,1 kΩ ±5%	5905-279-4623
R64	Composition 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R103	Film 21785 Ω ±1/4% 1/8 W	6619-2201	75042	CEA-TO, 21785 Ω ±1/4%	
TRANSISTORS					
Q1	Type 2N4125	8210-1125	93916	2N4125	
Q2	Type MEM-511C	8210-1188	14936	MEM-511C	
Q3	Type 2N4125	8210-1125	93916	2N4125	
Q4	Type MEM-511C	8210-1188	14936	MEM-511C	
Q5	Type 2N4125	8210-1125	93916	2N4125	
Q6	Type MEM-511C	8210-1188	14936	MEM-511C	
Q7	Type 2N4125	8210-1125	93916	2N4125	
Q8	Type MEM-511C	8210-1188	14936	MEM-511C	
Q9	Type 2N4125	8210-1125	93916	2N4125	
Q10	Type MEM-511C	8210-1188	14936	MEM-511C	
Q11	Type 2N4125	8210-1125	93916	2N4125	
Q12	Type MEM-511C	8210-1188	14936	MEM-511C	
Q13	Type 2N4125	8210-1125	93916	2N4125	
Q14	Type MEM-511C	8210-1188	14936	MEM-511C	
Q15	Type 2N4125	8210-1125	93916	2N4125	
Q16	Type MEM-511C	8210-1188	14936	MEM-511C	
Q17	Type 2N4125	8210-1125	93916	2N4125	
Q18	Type MEM-511C	8210-1188	14936	MEM-511C	
Q19	Type 2N4125	8210-1125	93916	2N4125	
Q20	Type MEM-511C	8210-1188	14936	MEM-511C	
Q21	Type 2N4125	8210-1125	93916	2N4125	
Q22	Type MEM-511C	8210-1188	14936	MEM-511C	
Q23	Type 2N4125	8210-1125	93916	2N4125	
Q24	Type MEM-511C	8210-1188	14936	MEM-511C	
Q25	Type 2N4125	8210-1125	93916	2N4125	
Q26	Type MEM-511C	8210-1188	14936	MEM-511C	
Q27	Type 2N4125	8210-1125	93916	2N4125	
Q28	Type MEM-511C	8210-1188	14936	MEM-511C	
Q29	Type 2N4125	8210-1125	93916	2N4125	
Q30	Type MEM-511C	8210-1188	14936	MEM-511C	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
TRANSISTORS (Cont)					
Q31	Type 2N4125	8210-1125	93916	2N4125	
Q32	Type MEM-511C	8210-1188	14936	MEM-511C	
Q33	Type 2N4125	8210-1125	93916	2N4125	
Q34	Type MEM-511C	8210-1188	14936	MEM-511C	
Q35	Type 2N4125	8210-1125	93916	2N4125	
Q36	Type MEM-511C	8210-1188	14936	MEM-511C	
Q37	Type 2N4125	8210-1125	93916	2N4125	
Q38	Type MEM-511C	8210-1188	14936	MEM-511C	
Q39	Type 2N4125	8210-1125	93916	2N4125	
Q40	Type MEM-511C	8210-1188	14936	MEM-511C	
Q41	Type 2N4125	8210-1125	93916	2N4125	
Q42	Type MEM-511C	8210-1188	14936	MEM-511C	
Q43	Type 2N4125	8210-1125	93916	2N4125	
Q44	Type MEM-511C	8210-1188	14936	MEM-511C	
Q45	Type 2N4125	8210-1125	93916	2N4125	
Q46	Type MEM-511C	8210-1188	14936	MEM-511C	
Q47	Type 2N4125	8210-1125	93916	2N4125	
Q48	Type MEM-511C	8210-1188	14936	MEM-511C	
Q49	Type 2N4125	8210-1125	93916	2N4125	
Q50	Type MEM-511C	8210-1188	14936	MEM-511C	
Q51	Type 2N4125	8210-1125	93916	2N4125	
Q52	Type MEM-511C	8210-1188	14936	MEM-511C	
Q53	Type 2N4125	8210-1125	93916	2N4125	
Q54	Type MEM-511C	8210-1188	14936	MEM-511C	
Q55	Type 2N4125	8210-1125	93916	2N4125	
Q56	Type MEM-511C	8210-1188	14936	MEM-511C	
Q57	Type 2N4125	8210-1125	93916	2N4125	
Q58	Type MEM-511C	8210-1188	14936	MEM-511C	
Q59	Type 2N4125	8210-1125	93916	2N4125	
Q60	Type MEM-511C	8210-1188	14936	MEM-511C	
Q61	Type 2N4125	8210-1125	93916	2N4125	
Q62	Type MEM-511C	8210-1188	14936	MEM-511C	
Q63	Type 2N4125	8210-1125	93916	2N4125	
Q64	Type MEM-511C	8210-1188	14936	MEM-511C	

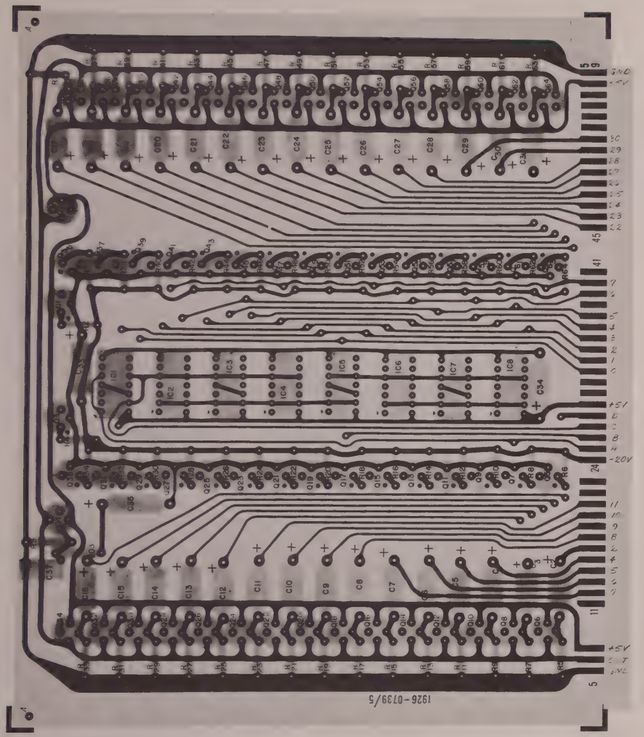


Figure 6-5. Etched-board assembly for 30-channel multiplexer (board C). Complete board is P/N 1926-4739.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

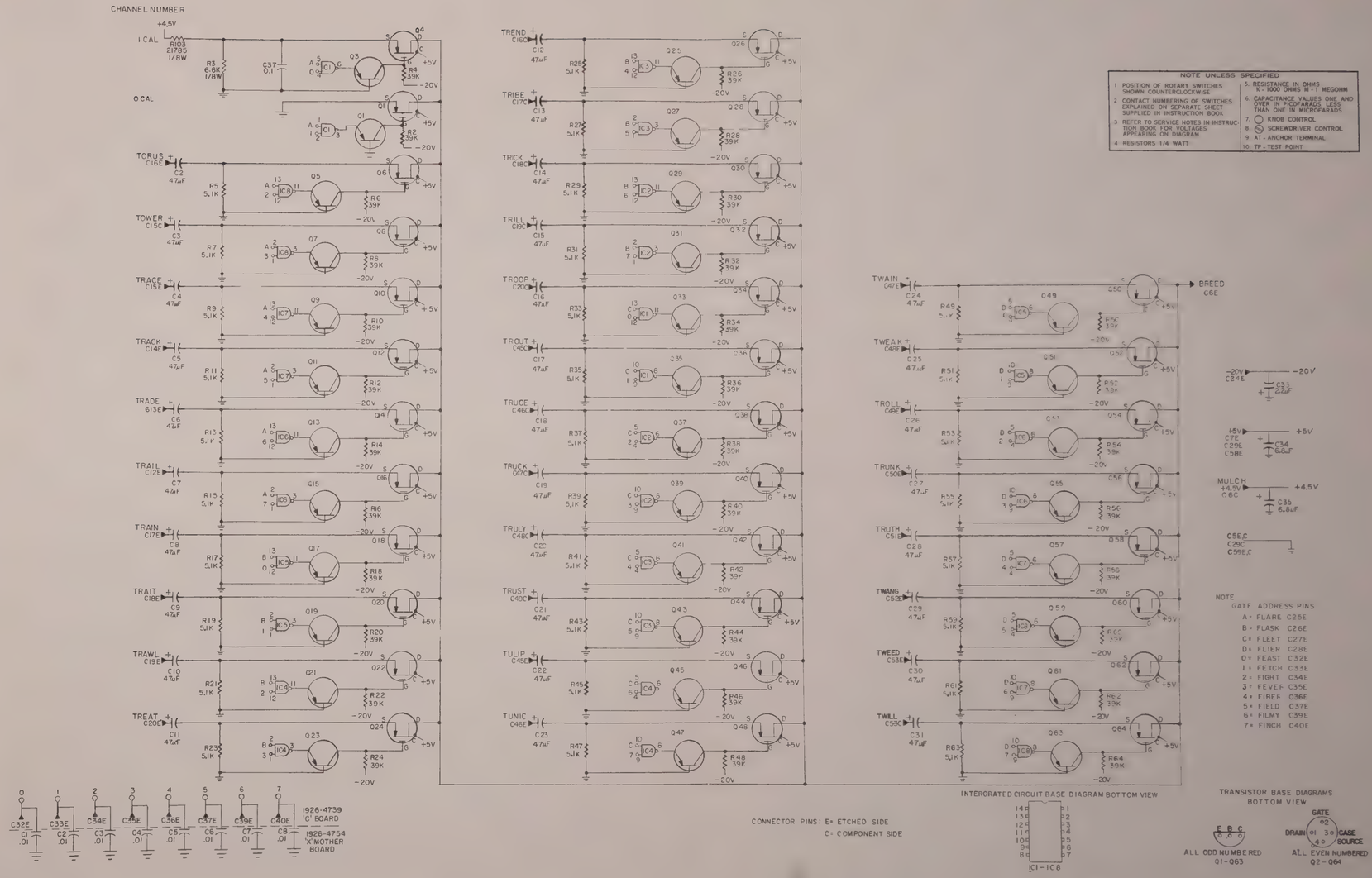


Figure 6-6. Schematic diagram of the 30-channel multiplexer.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C101	Mica 39 pF ±5% 500 V	4700-0307	14655	22A, 39 pF, ±5%	
C102	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C103	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C104	Electrolytic 2.2µF ±20% 20 V	4450-4500	56289	150D225X0020A2	5910-976-4604
C105	Electrolytic 2.2µF ±20% 20 V	4450-4500	56289	150D225X0020A2	5910-976-4604
C106	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C107	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C108	Ceramic 22 pF ±5% 500 V	4400-0230	78488	GA, 22 pF ±5%	
C109	Electrolytic 6.8µF ±20% 6 V	4450-4800	56289	150D685X0010A2	5910-936-1332
C201	Mica 47 pF ±5% 500 V	4700-0247	14655	22A5Q27KD	
C202	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C203	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C301	Trimmer .8-8.5	4910-1100	73899	VC9GW, .8 to 8.5 pF	5910-683-7157
C302	Trimmer .8-8.5	4910-1100	73899	VC9GW, .8 to 8.5 pF	5910-683-7157
C303	Ceramic 100 pF ±10% 500 V	4404-1108	72982	831, 100 pF ±10%	
C306	Mica 560 pF ±10% 300 V	4700-0626	14655	22A, 560 pF ±10%	
C307	Mica 560 pF ±10% 300 V	4700-0626	14655	22A, 560 pF ±10%	
C401	Mica 47 pF ±5% 500 V	4700-0247	14655	22A5Q47	
C402	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C403	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C404	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C501	Mica 47 pF ±5% 500 V	4700-0247	14655	22A5Q47	
C502	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C503	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C601	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C602	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C701	Ceramic 33 pF ±5% 500 V	4404-0335	72982	831, 33 pF, ±5%	
C702	Ceramic 33 pF ±5% 500 V	4404-0335	72982	831, 33 pF, ±5%	
C801	Ceramic 33 pF ±5% 500 V	4404-0335	72982	831, 33 pF ±5%	
C803	Ceramic 33 pF ±5% 500 V	4404-0335	72982	831, 33 pF ±5%	
C901	Mica 47 pF ±5% 500 V	4700-0247	14655	22A5Q47	
C902	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C903	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C904	Ceramic 10 pF ±5% 500 V	4410-0105	72982	811, 10 pF ±5%	
C1001	Mica 47 pF ±5% 500 V	4700-0247	14655	22A5Q47	
C1002	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C1003	Ceramic 0.1µF ±20% 25 V	4400-2050	80183	5C13, .1µF ±20%	5910-974-5695
C1004	Ceramic 2.2 pF ±10% 500 V	4400-0200	78488	GA, 2.2 pF ±10%	
DIODES					
CR101	Type 1N3604	6082-1001	24446	1N3604	5961-995-2199
CR102	Type 1N3604	6082-1001	24446	1N3604	5961-995-2199
CR104	Type 1N753A	6083-1006	07910	1N753A	5961-752-6121
CR105	Type 1N753A	6083-1006	07910	1N753A	5961-752-6121
CR403	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR601	Type 1N959B	6083-1010	72699	1N959B	
CR602	Type 1N753A	6083-1006	07910	1N753A	5961-752-6121
CR701	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR802	Type 1N995	6082-1002	80368	1N995	
CR803	Type 1N995	6082-1002	80368	1N995	
CR804	Type 1N995	6082-1002	80368	1N995	
INDUCTORS					
L101	Choke, molded 10µH ±10%	4300-2200	99800	1536, 10µH ±10%	
INTEGRATED CIRCUITS					
IC1	Type 726	5432-7261	07263	U5J772632X	
IC2	Type 937	5431-9372	07263	DTµL-937	
IC3	Type 948	5431-9482	07263	DTµL-948	
IC4	Type 710C	5432-7102	04713	MC1710CP	
IC5	Type 710C	5432-7102	04713	MC1710CP	
IC6	Type 710C	5432-7102	04713	MC1710CP	
RESISTORS					
R101	Film 536 kΩ ±1% 1/8 W	6250-3536	75042	CEA, 536 kΩ ±1%	
R102	Film 536 kΩ ±1% 1/8 W	6250-3536	75042	CEA, 536 kΩ ±1%	
R103	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R104	Pot. Comp. 20 kΩ ±10%	6049-0219	01121	SV2031	
R106	Film 536 Ω ±1% 1/8 W	6250-0536	75042	CEA, 536 Ω ±1%	
R107	Film 536 kΩ ±1% 1/8 W	6250-3565	75042	CEA, 536 kΩ ±1%	
R108	Comp. 100 kΩ ±5% 1/4 W	6099-4105	75042	BTS, 100 kΩ ±5%	5905-686-3129
R109	Film 9.09 kΩ ±1% 1/8 W	6250-1909	75042	CEA, 9.09 kΩ ±1%	
R110	Film 100 Ω ±0.1% 1/8 W	6619-1600	75042	CEA-TO 100 Ω ±0.1%	
R111	Film 12695 ±0.1% 1/8 W	6619-1785	75042	CEA-TO, 12695 ±0.1%	
R113	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA 4.02 kΩ ±1%	5905-702-7231
R114	Film 499 kΩ ±1% 1/8 W	6192-3502	75042	MEB-T2 499 kΩ ±1%	
R115	Pot. Comp. 50 kΩ ±10%	6049-0220	01121	SV5031	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R116	Film 499 kΩ ±1% 1/8 W	6192-3502	75042	MEB-T2 499 kΩ ±1%	
R117	Film 60.4 kΩ ±1% 1/8 W	6250-2604	75042	CEA, 60.4 kΩ ±1%	5905-755-0675
R118	Film 60.4 kΩ ±1% 1/8 W	6250-2604	75042	CEA, 60.4 kΩ ±1%	5905-755-0675
R120	Film 10 Ω ±1% 1/8 W	6250-0010	75042	CEA 10 Ω ±1%	5905-892-0062
R121	Film 732 Ω ±1% 1/8 W	6250-0732	75042	CEA 732 Ω ±1%	
R122	Film 10 Ω ±1% 1/8 W	6250-0010	75042	CEA 10 Ω ±1%	5905-892-0062
R123	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA 4.04 kΩ ±1%	5905-702-7231
R125	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R126	Comp. 4.7 Ω ±5% 1/4 W	6099-9475	75042	BTS 4.7 Ω ±5%	
R127	Film 1.54 k ±1% 1/8 W	6250-1154	75042	CEA 1.54 kΩ ±1%	
R128	Comp. 470 Ω ±5% 2 W	6110-1475	01121	RC20GF471J	5905-299-2051
R129	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS 10 kΩ ±5%	5905-683-2238
R130	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS 10 kΩ ±5%	5905-683-2238
R131	Comp. 330 Ω ±5% 1/8 W	6110-1335	01121	RC20GF331J	5905-279-2645
R132	Comp. 300 Ω ±5% 1/2 W	6100-1305	01121	RC20GF301J	5905-279-5481
R133	Comp. 51 Ω ±5% 1/4 W	6099-0515	75042	BTS, 51 Ω ±5%	
R134	Comp. 10 k ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R135	Film 53.6 k ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R136	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R201	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R202	Comp. 510 Ω ±5% 1/4 W	6099-1515	75042	BTS, 510 Ω ±5%	5905-801-8272
R203	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R204	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R205	Pot. Comp. 5 kΩ ±10%	6049-0217	01121	SV5021	
R206	Film 3.32 kΩ ±1% 1/8 W	6250-1332	75042	CEA, 3.32 kΩ ±1%	
R207	Film 3.32 kΩ ±1% 1/8 W	6250-1332	75042	CEA, 3.32 kΩ ±1%	
R208	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R209	Film 30.1 Ω ±1% 1/8 W	6250-2301	75042	CEA, 30.1 kΩ ±1%	5905-702-1760
R210	Film 30.1 Ω ±1% 1/8 W	6250-2301	75042	CEA, 30.1 kΩ ±1%	5905-702-1760
R211	Film 536 Ω ±1% 1/8 W	6250-0536	75042	CEA, 536 Ω ±1%	
R212	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R213	Film 1.54 k ±1% 1/8 W	6250-1154	75042	CEA, 1.54 kΩk ±1%	
R214	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R215	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R216	Comp. 4.7 Ω ±5% 1/4 W	6099-9475	75042	BTS, 4.7 Ω ±5%	
R217	Low Power Wire Wound 750 Ω ±5% 2 W	6760-1755	75042	BWH, 750 Ω ±5%	
R218	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R301	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R302	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R303	Comp. 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R306	Comp. 3 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R307	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-4097
R308	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-4097
R309	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS. 10 kΩ ±5%	5905-683-4097
R401	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R402	Comp. 510 Ω ±5% 1/4 W	6099-1515	75042	BTS, 510 Ω ±5%	5905-801-8272
R403	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R404	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R405	Pot. Comp. 10 kΩ ±10% 1/4 W	6049-0218	01121	SV1031	
R406	Film 10 kΩ ±1% 1/8 W	6250-2100	75042	CEA, 10 kΩ ±1%	5905-883-4847
R407	Film 10 kΩ ±1% 1/8 W	6250-2100	75042	CEA, 10 kΩ ±1%	5905-883-4847
R408	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R409	Film 30.1 Ω ±1% 1/8 W	6250-2301	75042	CEA, 30.1 kΩ ±1%	5905-702-1760
R410	Film 30.1 Ω ±1% 1/8 W	6250-2301	75042	CEA, 30.1 kΩ ±1%	5905-702-1760
R411	Film 536 Ω ±1% 1/8 W	6250-0536	75042	CEA, 536 Ω ±1%	
R412	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R413	Film 1.54 kΩ ±1% 1/8 W	6250-1154	75042	CEA, 1.54 kΩ ±1%	
R414	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R415	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R416	Comp. 4.7 Ω ±5% 1/4 W	6099-9475	75042	BTS, 4.7 Ω ±5%	
R417	Low Power Wire Wound 750 Ω ±5% 2 W	6760-1755	75042	BWH, 750 Ω ±5%	
R418	Comp. 10 kΩ ±5% 1/4 W/	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R501	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R502	Comp. 510 Ω ±5% 1/4 W	6099-1515	75042	BTS, 510 Ω ±5%	5905-801-8272
R503	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 Ω ±1%	5905-723-4003
R504	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 Ω ±1%	5905-723-4003
R505	Pot. Comp. 5 kΩ ±10%	6049-0217	01121	SV5021	
R506	Film 3.32 kΩ ±1% 1/8 W	6250-1332	75042	CEA, 3.32 kΩ ±1%	
R507	Film 3.32 kΩ ±1% 1/8 W	6250-1332	75042	CEA, 3.32 kΩ ±1%	
R508	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R509	Film 30.1 Ω ±1% 1/8 W	6250-2301	75042	CEA, 30.1 kΩ ±1%	5905-702-1760
R510	Film 30.1 Ω ±1% 1/8 W	6250-2301	75042	CEA, 30.1 kΩ ±1%	5905-702-1760
R511	Film 536 Ω ±1% 1/8 W	6250-0536	75042	CEA, 536 Ω ±1%	
R512	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R513	Film 1.54 k ±1% 1/8 W	6250-1154	75042	CEA, 1.54 kΩ ±1%	
R514	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R515	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R601	Comp. 510 Ω ±5% 1/4 W	6099-1515	75042	BTS, 510 Ω ±5%	5905-801-8272
R602	Comp. 470 Ω ±5% 1/4 W	6099-1475	75042	BTS, 470 Ω ±5%	5905-683-2242
R603	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R604	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R605	Film 1 kΩ ±1/4% 1/8 W	6252-1100	75042	CEA-TO, 1 kΩ 1/4%	
R607	Film 4935 Ω ±1/4% 1/8 W	6619-2225	75042	CEA-TO, 4935 Ω 1/4%	
R608	Film 1.54 k ±1% 1/8 W	6250-1154	75042	CEA, 1.54 kΩ ±1%	
R609	Comp. 470 Ω ±5% 1/4 W	6099-1475	75042	BTS, 470 Ω ±5%	5905-683-2242
R610	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R611	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R613	Film 1 kΩ ±1/4% 1/8 W	6252-1100	75042	CEA-TO, 1 kΩ 1/4%	
R615	Film 4935 Ω ±1/4% 1/8 W	6619-2225	75042	CEA-TO, 4935 Ω 1/4%	
R616	Film 1.54 k ±1% 1/8 W	6250-1154	75042	CEA, 1.54 kΩ ±1%	
R617	Comp. 470 Ω ±5% 1/4 W	6099-1475	75042	BTS, 470 Ω ±5%	5905-683-2242
R618	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R619	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R620	Comp. 560 Ω ±5% 1/4 W	6100-1565	01121	RC20GF561J	5905-195-6800
R621	Comp., 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6422
R701	Comp. 4.3 kΩ ±5% 1/4 W	6099-2435	75042	BTS, 4.3 kΩ ±5%	
R702	Comp. 3 kΩ ±5% 1/4 W	6099-2305	75042	BTS. 3 kΩ ±5%	5905-682-4097
R703	Comp. 30 kΩ ±5% 1/4 W	6099-3305	75042	BTS. 30 kΩ ±5%	5905-803-2908
R704	Comp. 3 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R801	Comp. 4.3 kΩ ±5% 1/4 W	6099-2435	75042	BTS, 4.3 kΩ ±5%	
R802	Comp. 3 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R804	Comp. 3 kΩ ±5% 1/4 W	6099-2305	75042	BTS. 3 kΩ ±5%	5905-682-4097
R805	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R806	Comp. 4.3 kΩ ±5% 1/4 W	6099-2435	75042	BTS, 4.3 kΩ ±5%	
R901	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R902	Comp. 510 Ω ±5% 1/4 W	6099-1515	75042	BTS, 510 Ω ±5%	5905-801-8272
R903	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 Ω ±1%	5905-723-4003
R904	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 Ω ±1%	5905-723-4003
R905	Pot. Comp. 5 kΩ ±10%	6049-0217	01121	SV5021	
R906	Film 3.32 kΩ ±1% 1/8 W	6250-1332	75042	CEA. 3.32 kΩ ±1%	
R907	Film 3.32 kΩ ±1% 1/8 W	6250-1332	75042	CEA, 3.32 kΩ ±1%	
R908	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA. 15 kΩ ±1%	5905-581-7626
R909	Film 3000 Ω ±0.1% 1/8 W	6619-1685	75042	CEA-TO. 3000 Ω 0.1%	
R910	Film 2908 Ω ±0.1% 1/8 W	6619-1680	75042	CEA-TO, 2908 Ω 0.1%	
R912	Film 14.3 Ω ±1% 1/8 W	6250-9143	75042	CEA, 14.3 Ω ±1%	
R913	Film 14.3 Ω ±1% 1/8 W	6250-9143	75042	CEA, 14.3 Ω ±1%	
R914	Film 536 Ω ±1% 1/8 W	6250-0536	75042	CEA, 536 Ω ±1%	
R915	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R917	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R1001	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R1002	Comp. 510 Ω ±5% 1/4 W	6099-1515	75042	BTS, 510 Ω ±5%	5905-801-8272
R1003	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 Ω ±1%	5905-723-4003
R1011	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R1012	Pot. Comp. 10 kΩ ±10%	6049-0218	01121	SV1031	
R1013	Comp. 10 kΩ ±1% 1/8 W	6250-2100	75042	CEA, 10 kΩ ±1%	5905-883-4847
R1014	Comp. 10 kΩ ±1% 1/8 W	6250-2100	75042	CEA, 10 kΩ ±1%	5905-883-4847
R1015	Comp. 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R1016	Film 50 kΩ ±0.1% 1/8 W	6619-1830	75042	CEA-TO, 50 kΩ ±.1%	
R1017	Film 50.38 kΩ ±0.1% 1/8 W	6619-1833	75042	CEA-TO, 50.38 kΩ ±.1%	
R1019	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R1020	Film 1.54 kΩ ±1% 1/8 W	6250-1154	75042	CEA. 1.54 kΩ ±1%	
R1021	Film 12.7 Ω ±1% 1/8 W	6250-9127	75042	CEA, 12.7 kΩ ±1%	
R1022	Film 12.7 Ω ±1% 1/8 W	6250-9127	75042	CEA, 12.7 kΩ ±1%	
R1023	Film 536 Ω ±1% 1/8 W	6250-0536	75042	CEA, 536 Ω ±1%	
R1024	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ 1%	5905-581-7626
TRANSISTORS					
Q101	Type 2N3955	8210-1181	61637	2N3955	
Q103	Type TD-400	8210-1169	56289	TD-400	
Q104	Type TD-601	8210-1186	56289	TD-601	
Q201	Type 2N3955	8210-1181	56289	2N3955	
Q202	Type TD-100	8210-1130	56289	TD-100	
Q203	Type TD-400	8210-1169	56289	TD-400	
Q204	Type TD-601	8210-1186	56289	TD-601	
Q301	Type 2N4123	8210-1123	93916	2N4123	
Q302	Type 2N4123	8210-1123	93916	2N4123	
Q303	Type MEM-511A	8210-1180	77638	MEM-511A	
Q304	Type MEM-511A	8210-1180	77638	MEM-511A	
Q305					
Q306					
Q307					
Q308	Type 2N4125	8210-1125	93916	2N4125	
Q309	Type 2N4123	8210-1123	93916	2N4123	
Q310	Type 2N4123	8210-1123	93916	2N4123	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
TRANSISTORS (Cont)					
Q401	Type 2N3955	8210-1181	61637	2N3955	
Q402	Type TD-100	8210-1130	56289	TD-100	
Q403	Type TD-400	8210-1169	56289	TD-400	
Q404	Type TD-601	8210-1186	56289	TD-601	
Q501	Type 2N3955	8210-1181	61637	2N3955	
Q502	Type TD-100	8210-1130	56289	TD-100	
Q503	Type TD-400	8210-1169	56289	TD-601	
Q701	Type 2N4125	8210-1125	93916	2N4125	
Q702	Type 2N4125	8210-1125	93916	2N4125	
Q703	Type MEM-511A	8210-1180	77638	MEM-511A	
Q704	Type MEM-511A	8210-1180			
Q801	Type 2N4125	8210-1125	93916	2N4125	
Q802	Type 2N4125	8210-1125	93916	2N4125	
Q803	Type MEM-511A	8210-1180	77638	MEM-511A	
Q804	Type MEM-511A	8210-1180	77638	MEM-511A	
Q901	Type 2N3955	8210-1181	61637	2N3955	
Q902	Type TD-100	8210-1130	56289	TD-100	
Q903	Type TD-400	8210-1169	56289	TD-400	
Q1001	Type 2N3955	8210-1181	61637	2N3955	
Q1002	Type TD-100	8210-1130	56289	TD-100	
Q1003	Type TD-400	8210-1169	56289	TD-400	

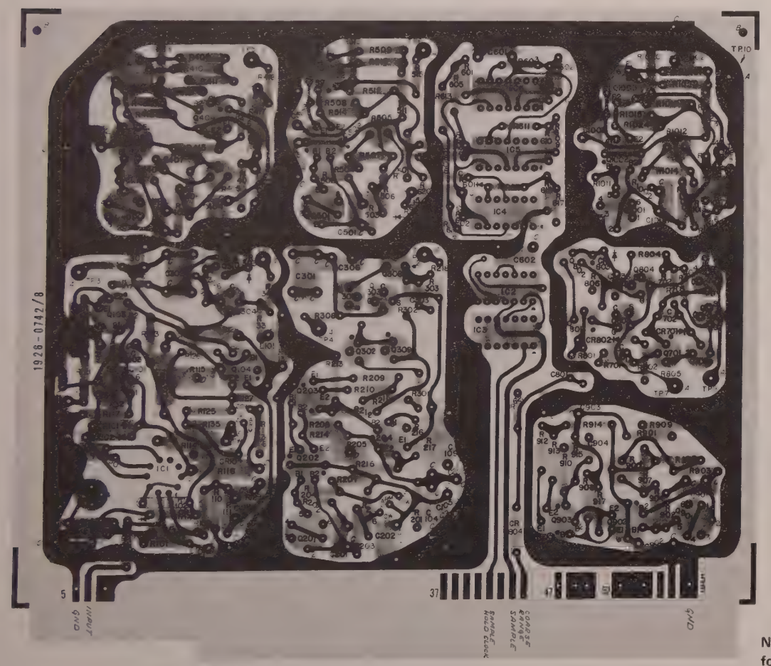
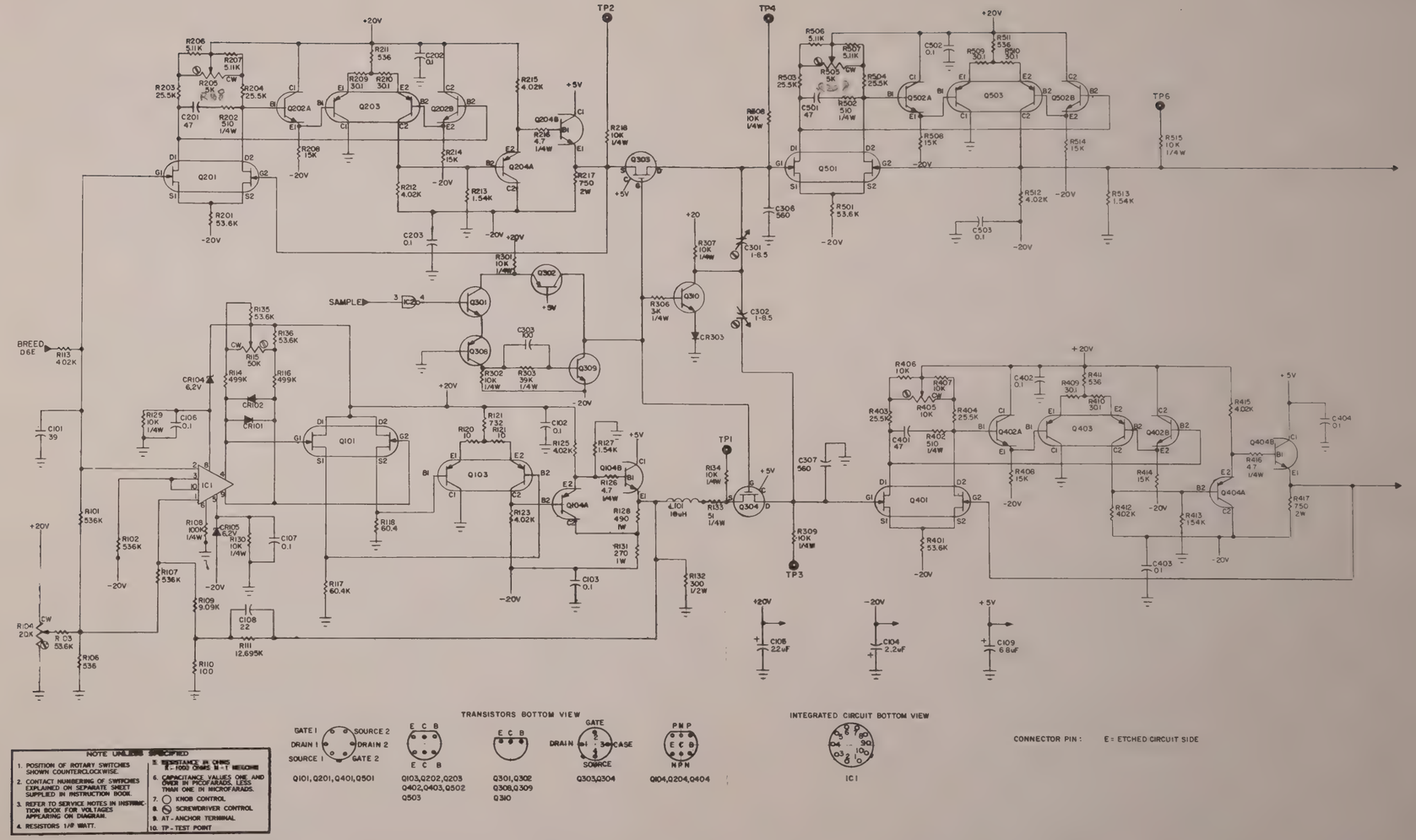


Figure 6-7. Etched-board assembly for sample-hold circuit (board D). Complete board is P/N 1926-4742.

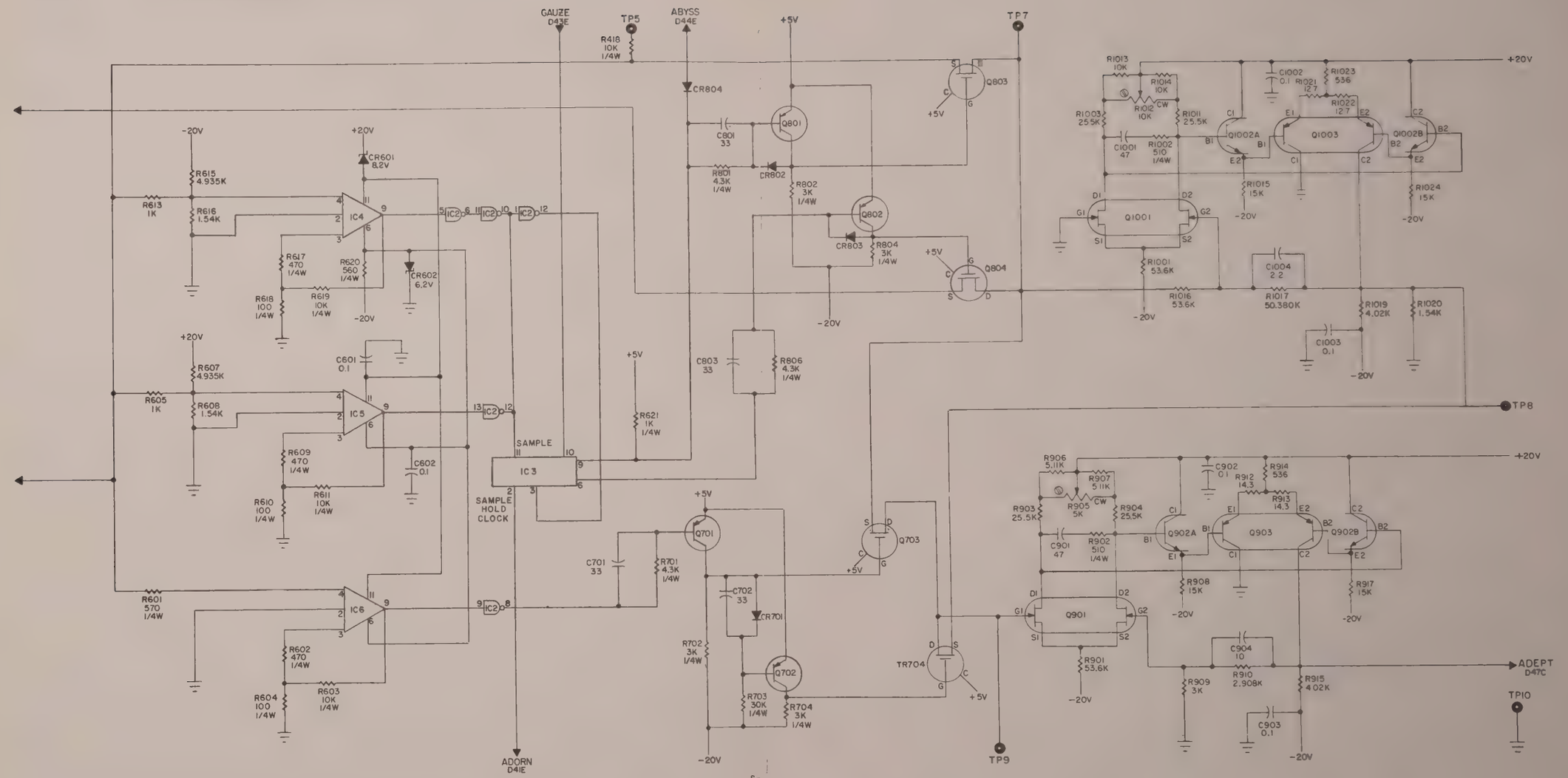


NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

Figure 6-8. Schematic diagram of the sample-hold circuit. See, also, Figure 6-9.

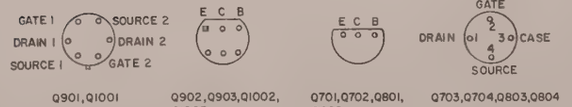
POWER CONNECTIONS FOR DIAGRAMS
1926-2DD-1 & 2

GNDSG	SIGNAL GROUND	D5C,D7C,D8C,D57C,D58C,D59C D5E,D7E,D8E,D57E,D58E,D59E
PL05B	POSITIVE 5 VOLTS	D39C
PLS20	POSITIVE 20 VOLTS	D54C
MIN20	NEGATIVE 20 VOLTS	D48C,D49C,D50C D48E,D49E,D50E

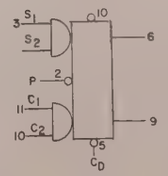


NOTE UNLESS SPECIFIED

1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE.
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK.
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/8 WATT.
5. RESISTANCE IN OHMS K = 1000 OHMS M = 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS.
7. ◯ KNOB CONTROL
8. ⊘ SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT



Q901,Q1001 | Q902,Q903,Q1002, Q1003 | Q701,Q702,Q801, Q802 | Q703,Q704,Q803,Q804



INTEGRATED CIRCUIT BOTTOM VIEW

IC2,IC3,IC4,IC5,IC6

Figure 6-9. Schematic diagram of the sample-hold circuit. See, also, Figure 6-8.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Electrolytic 2.2μF ±20% 20 V	4450-4500	56289	150D225X0020A2	5910-976-4604
C2	Electrolytic 2.2μF ±20% 20 V	4450-4500	56289	150D225X0020A2	5910-976-4604
C3	Electrolytic 6.8μF ±20% 6 V	4450-4800	56289	150D685X0010A2	5910-936-1332
C4	Electrolytic 6.8μF ±20% 6 V	4450-4800	56289	150D685X0010A2	5910-936-1332
C101	Mica 62pF ±5% 500 V	4700-0364	14655	22A, 62pF ±5%	
C103	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C104	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C110	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF, ±10%	
C111	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF, ±10%	
C112	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF, ±10%	
C115	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C116	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C117	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C118	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C119	Ceramic 1pF ±10% 500 V	4400-0100	78488	GA, 1pF ±10%	5910-981-3425
C201	Mica 62pF ±5% 500 V	4700-0364	14655	22A, 62pF ±5%	
C203	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C204	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C210	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C211	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C212	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C215	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C216	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C301	Mica 62pF ±5% 500 V	4700-0364	14655	22A, 62pF ±5%	
C303	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C304	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C310	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF, ±10%	
C311	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF, ±10%	
C312	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF, ±10%	
C315	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF, ±20%	
C316	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C401	Ceramic 47pF ±10% 500 V	4404-0478	72982	831, 47pF ±10%	
C402	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF, ±10%	
C501	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C502	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C503	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C504	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
C506	Ceramic 0.1μF ±20% 500 V	4404-2050	72982	831, 0.1μF ±20%	
C601	Ceramic 100pF ±10% 500 V	4404-1108	72982	831, 100pF ±10%	
DIODES					
CR102	Type 1N758A	6083-1012	07910	1N758A	
CR103	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR201	Type 1N4009	6082-1012	24446	1N4009	
CR301	Type 1N4009	6082-1012	24446	1N4009	
CR401	Type 1N959B	6083-1010	72699	1N959B	
CR402	Type 1N753A	6083-1006	07910	1N753A	5961-752-6121
CR601	Type 1N995	6082-1002	80368	1N995	
CR602	Type 1N995	6082-1002	80368	1N995	
INTEGRATED CIRCUITS					
IC401	Type 710C	5432-7102	07263	MC1710CP	
IC402	Type 937	5431-9372	07263	DTμL-937	
IC600	Type 948	5431-9482	07263	DTμL-948	
IC601	Type 945	5431-9452	07263	DTμL-945	
IC602	Type 945	5431-9452	07263	DTμL-945	
IC603	Type 963	5431-9632	07263	DTμL-963	
IC604	Type 945	5431-9452	07263	DTμL-945	
IC605	Type 945	5431-9452	07263	DTμL-945	
IC607	Type 945	5431-9452	07263	DTμL-945	
IC610	Type 945	5431-9452	07263	DTμL-945	
IC611	Type 948	5431-9482	07263	DTμL-948	
IC612	Type 948	5431-9482	07263	DTμL-948	
IC613	Type 948	5431-9482	07263	DTμL-948	
IC614	Type 948	5431-9482	07263	DTμL-948	
IC615	Type 9093	5431-9093	07263	DTμL-9093	
IC616	Type 962	5431-9622	07263	DTμL-962	
IC617	Type 945	5431-9452	07263	DTμL-945	
IC620	Type 9099	5431-9099	07263	DTμL-9099	
IC621	Type 945	5431-9452	07263	DTμL-945	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
INTEGRATED CIRCUITS (Cont)					
IC622	Type 945	5431-9452	07263	DTμL-945	
IC623	Type 936	5431-9362	07263	DTμL-936	
IC624	Type 962	5431-9622	07263	DTμL-962	
IC625	Type 946	5431-9462	07263	DTμL-946	
IC630	Type 944	5431-9442	07263	DTμL-944	
RESISTORS					
R101					
R102	Film 35170Ω ±0.1% 1/8 W	6619-1821	75042	CEA-TO, 35170Ω ±0.1%	
R103	Film 5000Ω ±0.1% 1/8 W	6619-1730	75042	CEA-TO, 5000Ω, ±0.1%	
R104	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R105	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R106	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R107	Comp. 750Ω ±5% 1/4 W	6099-1755	75042	BTS, 750Ω ±5%	
R108	Pot. Comp. 2 kΩ ±10%	6049-0216	01121	SV2021	
R109	Film 5.11 kΩ ±1% 1/8 W	6250-1511	75042	CEA, 5.11 kΩ ±1%	5905-577-6734
R110	Film 5.11 kΩ ±1% 1/8 W	6250-1511	75042	CEA, 5.11 kΩ ±1%	5905-577-6734
R111	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R112	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R113	Comp. 4.7 Ω ±5% 1/4 W	6099-9475	75042	BTS, 4.7 Ω ±5%	
R114	Comp. 4.7 Ω ±5% 1/4 W	6099-9475	75042	BTS, 4.7 Ω ±5%	
R115	Film 287 Ω ±1% 1/8 W	6250-0287	75042	CEA, 287 Ω ±1%	
R116	Film 2.05 kΩ ±1% 1/8 W	6350-1205	75042	CEB, 2.05 kΩ ±1%	
R117	Film 3221Ω ±0.1% 1/8 W	6619-1688	75042	CEA-TO, 3221Ω ±.1%	
R118	Film 825Ω ±0.1% 1/8 W	6619-1635	75042	CEA-TO, 825Ω ±.1%	
R120	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R121	Comp. 7.5 kΩ ±5% 1/4 W	6099-2755	75042	BTS, 7.5 kΩ ±5%	
R123	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R124	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R125	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R126	Comp. 100 kΩ ±5% 1/4 W	6099-4105	75042	BTS, 100 kΩ ±5%	5905-686-3129
R128	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R202	Film, 7530Ω ±0.1% 1/8 W	6619-1751	75042	CEA-TO, 7530Ω ±0.1%	
R203	Film, 2.5 kΩ 0.1%	6619-1130	75042	CEA-TO, 2.5 kΩ ±0.1%	
R204	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R205	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R206	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R207	Comp. 750Ω ±5% 1/4 W	6099-1755	75042	BTS, 750Ω ±5%	
R208	Pot. Comp. 2 kΩ ±10%	6049-0216	01121	SV2021	
R209	Film 5.11 kΩ ±1% 1/8 W	6250-1511	01121	CEA, 5.11 kΩ ±1%	5905-577-6734
R210	Film 5.11 kΩ ±1% 1/8 W	6250-1511	01121	CEA, 5.11 kΩ ±1%	5905-577-6734
R211	Film 15 kΩ ±1% 1/8 W	6250-2150	01121	CEA, 15 kΩ ±1%	5905-581-7626
R212	Film 15 kΩ ±1% 1/8 W	6250-2150	01121	CEA, 15 kΩ ±1%	
R213	Comp. 4.7 Ω ±5% 1/4 W	6099-9475	01121	BTS, 4.7Ω ±5%	
R214	Comp. 4.7Ω ±5% 1/4 W	6099-9475	75042	BTS, 4.7Ω ±5%	
R215	Film 287Ω ±1% 1/8 W	6250-0287	75042	CEA, 287Ω ±1%	
R216	Film 2.05 kΩ ±1% 1/4 W	6350-1205	75042	CEB, 2.05 kΩ ±1%	
R217	Film 3221Ω ±0.1% 1/8 W	6619-1688	75042	CEA-TO, 3221Ω ±.1%	
R218	Film 825Ω ±0.1% 1/8 W	6619-1635	75042	CEA-TO, 825Ω ±.1%	
R220	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R221	Comp. 7.5 kΩ ±5% 1/4 W	6099-2755	75042	BTS, 7.5 kΩ ±5%	
R223	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R224	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R225	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R302	Film 5018Ω ±0.1% 1/8 W	6619-1735	75042	CEA-TO, 5018Ω ±.1%	
R303	Film 5018Ω ±0.1% 1/8 W	6619-1730	75042	CEA-TO, 5000Ω ±.1%	
R304	Film 53.6 kΩ ±1% 1/8 W	6250-2536	75042	CEA, 53.6 kΩ ±1%	
R305	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R306	Film 25.5 kΩ ±1% 1/8 W	6250-2255	75042	CEA, 25.5 kΩ ±1%	5905-723-4003
R307	Comp. 750 Ω ±5% 1/4 W	6099-1755	75042	BTS, 750 Ω ±5%	
R311	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R312	Film 15 kΩ ±1% 1/8 W	6250-2150	75042	CEA, 15 kΩ ±1%	5905-581-7626
R313	Film 12.7 Ω ±1% 1/8 W	6250-9127	75042	CEA, 12.7 Ω ±1%	
R314	Film 12.7 Ω ±1% 1/8 W	6250-9127	75042	CEA, 12.7 Ω ±1%	
R315	Film 536 Ω ±1% 1/8 W	6250-0536	75042	CEA, 536 Ω ±1%	
R316	Film 4.02 kΩ ±1% 1/8 W	6250-1402	75042	CEA, 4.04 kΩ ±1%	5905-702-7231
R317	Film 4442 Ω ±0.1% 1/8 W	6619-1712	75042	CEA-TO, 4442 Ω ±.1%	
R320	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R321	Comp. 7.5 kΩ ±5% 1/4 W	6099-2755	75042	BTS, 7.5 kΩ ±5%	
R323	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R324	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R325	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R326	Comp. 560 Ω ±5% 1/4 W	6099-1565	75042	BTS, 560 Ω ±5%	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R401	Comp. 470 Ω ±5% 1/4 W	6099-1475	75042	BTS, 470 Ω ±5%	5905-683-2242
R402	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R403	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R404	Comp. 3 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R405	Comp. 1300 Ω ±5% 1/4 W	6099-2135	75042	BTS, 1.3 kΩ ±5%	5905-686-3119
R406	Comp. 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ ±5%	5905-279-4629
R502	Comp. 3.9 kΩ ±5% 1/4 W	6099-2395	75042	BTS, 3.9 kΩ ±5%	
R504	Comp. 3.9 kΩ ±5% 1/4 W	6099-2395	75042	BTS, 3.9 kΩ ±5%	
R506	Comp. 3.9 kΩ ±5% 1/4 W	6099-2395	75042	BTS, 3.9 kΩ ±5%	
R508	Comp. 3.9 kΩ ±5% 1/4 W	6099-2395	75042	BTS, 3.9 kΩ ±5%	
R520	Film 4990 Ω ±0.1% 1/8 W	6619-1727	75042	CEA-TO, 4990 Ω ±.1%	
R521	Film 9990 Ω ±0.1% 1/8 W	6619-1778	75042	CEA-TO, 9990 Ω ±.1%	
R522	Film 20 kΩ ±1/4% 1/8 W	6252-2200	75042	CEA-TO, 20 kΩ ±1/4%	
R523	Film 40 kΩ ±1/4% 1/8 W	6252-2400	75042	CEA-TO, 24 kΩ 1/4%	
R524	Film 348 kΩ ±1/4% 1/8 W	6252-3348	75042	CEA-TO, 348 kΩ ±1/4%	
R525	Film 7.5 kΩ ±1/4% 1/8 W	6250-1750	75042	CEA, 7.5 kΩ ±1%	5905-660-4129
R527	Comp. 20 kΩ ±5% 1/4 W	6099-3205	75042	BTS, 20 kΩ ±5%	5905-686-3368
R601	Comp. 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ, ±5%	5905-279-4629
R602	Comp., 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ, ±5%	5905-279-4629
R603	Comp., 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ, ±5%	5905-279-4629
TRANSISTORS					
Q101	Type 2N3955	8210-1181	61637	2N3955	
Q102	Type TD-100	8210-1130	56289	TD-100	
Q103	Type TD-400	8210-1169	56289	TD-400	
Q104	Type 2N4125	8210-1125	93916	2N4125	
Q105	Type 2N4125	8210-1125	93916	2N4125	
Q106	Type 2N4123	8210-1123	93916	2N4123	
Q107	Type 2N3970	8210-1182	61637	2N3970	
Q108	Type 2N3970	8210-1182	61637	2N3970	
Q109	Type 2N4123	8210-1123	93916	2N4123	
Q201	Type 2N3955	8210-1181	61637	2N3955	
Q202	Type TD-100	8210-1130	56289	TD-100	
Q203	Type TD-400	8210-1169	56289	TD-400	
Q204	Type 2N4125	8210-1125	93916	2N4125	
Q205	Type 2N4125	8210-1125	93916	2N4125	
Q206	Type 2N4123	8210-1123	93916	2N4123	
Q207	Type 2N3970	8210-1182	61637	2N3970	
Q301	Type 2N3955	8210-1181	61637	2N3955	
Q302	Type TD-100	8210-1130	56289	TD-100	
Q303	Type TD-400	8210-1169	56289	TD-400	
Q304	Type 2N4125	8210-1125	93916	2N4125	
Q305	Type 2N4125	8210-1125	93916	2N4125	
Q306	Type 2N4123	8210-1123	93916	2N4123	
Q307	Type 2N3970	8210-1182	61637	2N3970	
Q401	Type 2N4123	8210-1123	93916	2N4123	
Q501	Type 2N4125	8210-1125	93916	2N4125	
Q502	Type 2N4123	8210-1123	93916	2N4123	
Q503	Type 2N4125	8210-1125	93916	2N4125	
Q504	Type 2N4123	8210-1123	93916	2N4123	
Q505	Type 2N4125	8210-1125	93916	2N4125	
Q506	Type 2N4123	8210-1123	93916	2N4123	
Q507	Type 2N4125	8210-1125	93916	2N4125	
Q508	Type 2N4123	8210-1123	93916	2N4123	

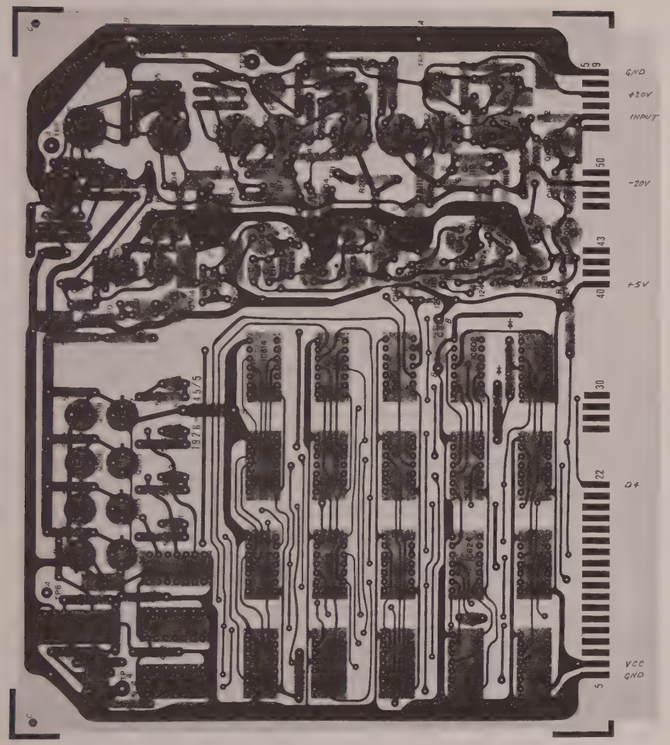


Figure 6-10. Etched-board assembly for the A-D converter (board E). Complete board is P/N 1926-4745.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

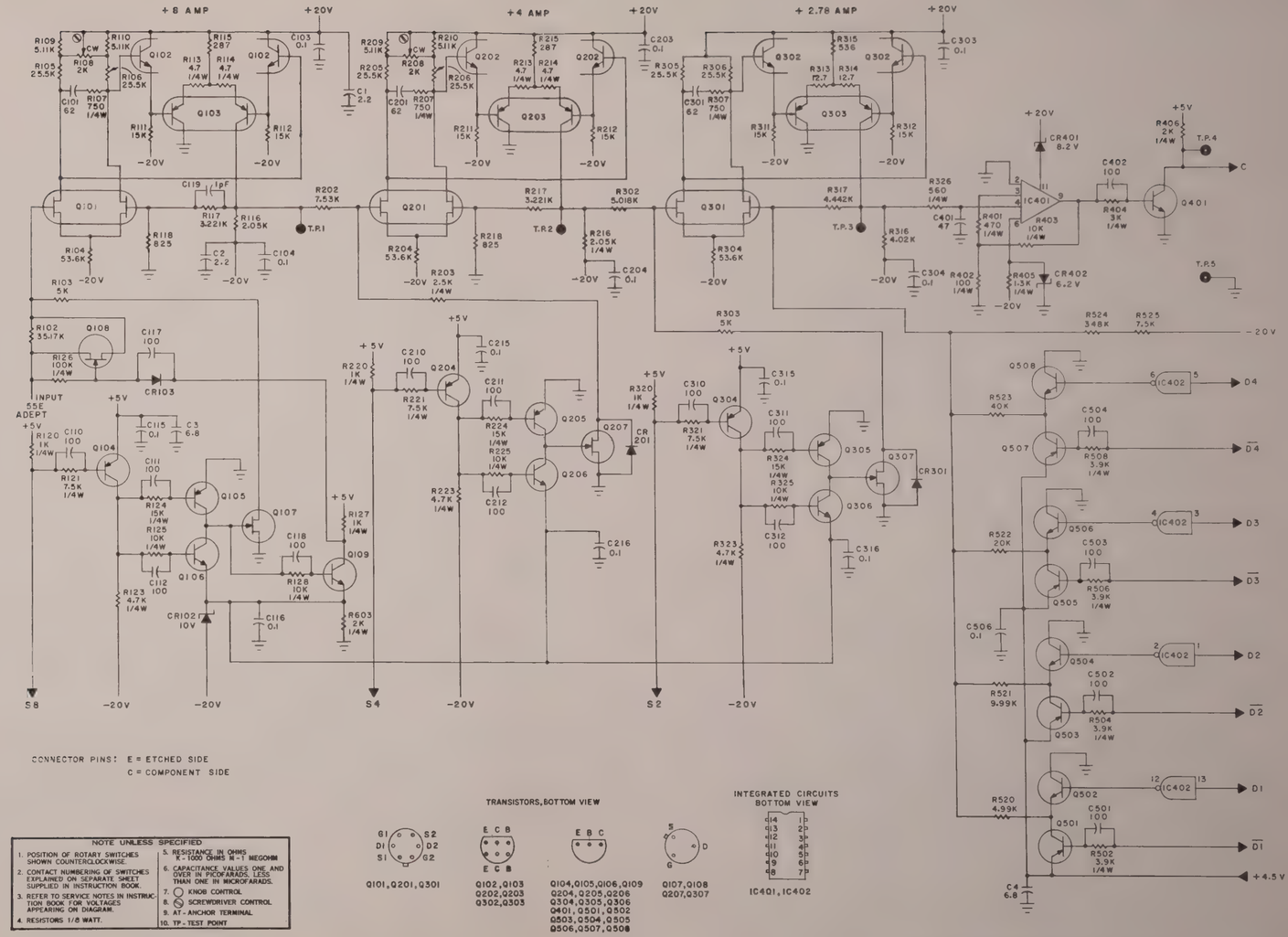

+8 AMP
+4 AMP
+2.78 AMP
+20V
-20V
+5V
INPUT 55E ADEPT
T.P.1
T.P.2
T.P.3
T.P.4
T.P.5
S8
S4
S2
CONNECTOR PINS: E = ETCHED SIDE
C = COMPONENT SIDE
NOTE UNLESS SPECIFIED
1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE.
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK.
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/8 WATT.
5. RESISTANCE IN OHMS K = 1000 OHMS M = 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS. LESS THAN ONE IN MICROFARADS.
7. KNOB CONTROL
8. SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT
TRANSISTORS, BOTTOM VIEW
Q101, Q201, Q301
Q102, Q103 Q202, Q203 Q302, Q303
Q104, Q105, Q106, Q109 Q204, Q205, Q206 Q304, Q305, Q306 Q401, Q501, Q502 Q503, Q504, Q505 Q506, Q507, Q508
Q107, Q108 Q207, Q307
INTEGRATED CIRCUITS BOTTOM VIEW
IC401, IC402
+4.5 V

Figure 6-11. Schematic diagram of the A-to-D converter. See, also, Figure 6-12.

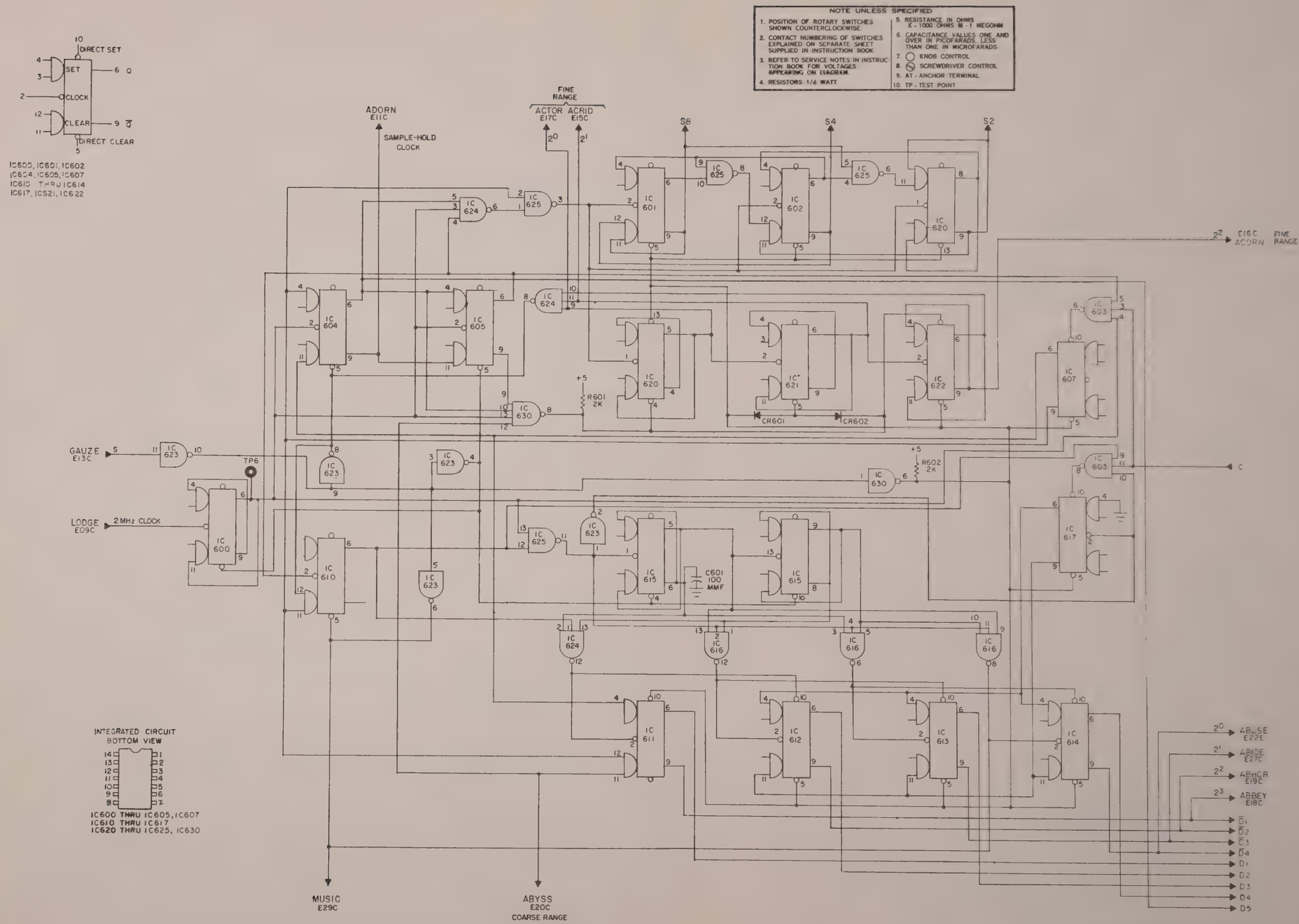


Figure 6-12. Schematic diagram of the A-D converter. See, also, Figure 6-11.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Ceramic, 0.001 µF ±10% 500 V	4405-2108	72982	801, 0.001 µF 10%	5910-914-0087
DIODES					
CR1	Type 1N995	6082-1002	80368	1N995	
CR2	Type 1N995	6082-1002	80368	1N995	
INTEGRATED CIRCUITS					
IC1	Type 9097	5431-9097			
IC2	Type 961	5431-9612			
IC3	Type 946	5431-9462	07263	DTµL-946	
IC4	Type 937	5431-9372	07263	DTµL-937	
IC5	Type 9097	5431-9097	07263	DTµL-9097	
IC6	Type 963	5431-9632	07263	DTµL-963	
IC7	Type 962	5431-9622	07263	DTµL-962	
IC8	Type 948	5431-9482	07263	DTµL-948	
IC9	Type 9097	5431-9097	07263	DTµL-9097	
IC10	Type 949	5431-9492	07263	DTµL-949	
IC11	Type 936	5431-9362	07263	DTµL-936	
IC12	Type 948	5431-9482	07263	DTµL-948	
IC13	Type 9097	5431-9097	07263	DTµL-9097	
IC14	Type 937	5431-9372	07263	DTµL-937	
IC15	Type 949	5431-9492	07263	DTµL-949	
IC16	Type 948	5431-9482	07263	DTµL-948	
IC17	Type 9097	5431-9097	07263	DTµL-9097	
IC18	Type 944	5431-9442	07263	DTµL-944	
IC19	Type 936	5431-9362	07263	DTµL-936	
IC20	Type 963	5431-9632	07263	DTµL-963	
IC21	Type 9097	5431-9097	07263	DTµL-9097	
IC22	Type 936	5431-9362	07263	DTµL-936	
IC23	Type 946	5431-9462	07263	DTµL-946	
IC24	Type 948	5431-9482	07263	DTµL-948	
IC25	Type 9097	5431-9097	07263	DTµL-9097	
IC26	Type 936	5431-9362	07263	DTµL-936	
IC27	Type 946	5431-9462	07263	DTµL-946	
RESISTORS					
R1	Comp., 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ ±5%	5905-686-3370
R2	Comp., 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ ±5%	5905-686-3370
R3	Comp., 200 Ω ±5%	6099-2105	75042	BTS, 200 Ω ±5%	5905-681-6422

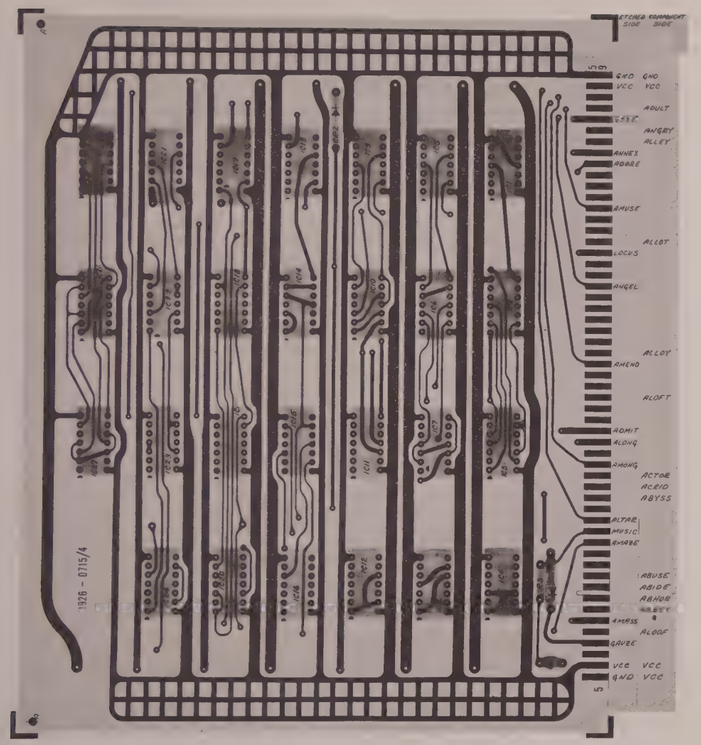


Figure 6-13. Etched-board assembly for the squarer (board G). Complete board is P/N 1926-4715.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

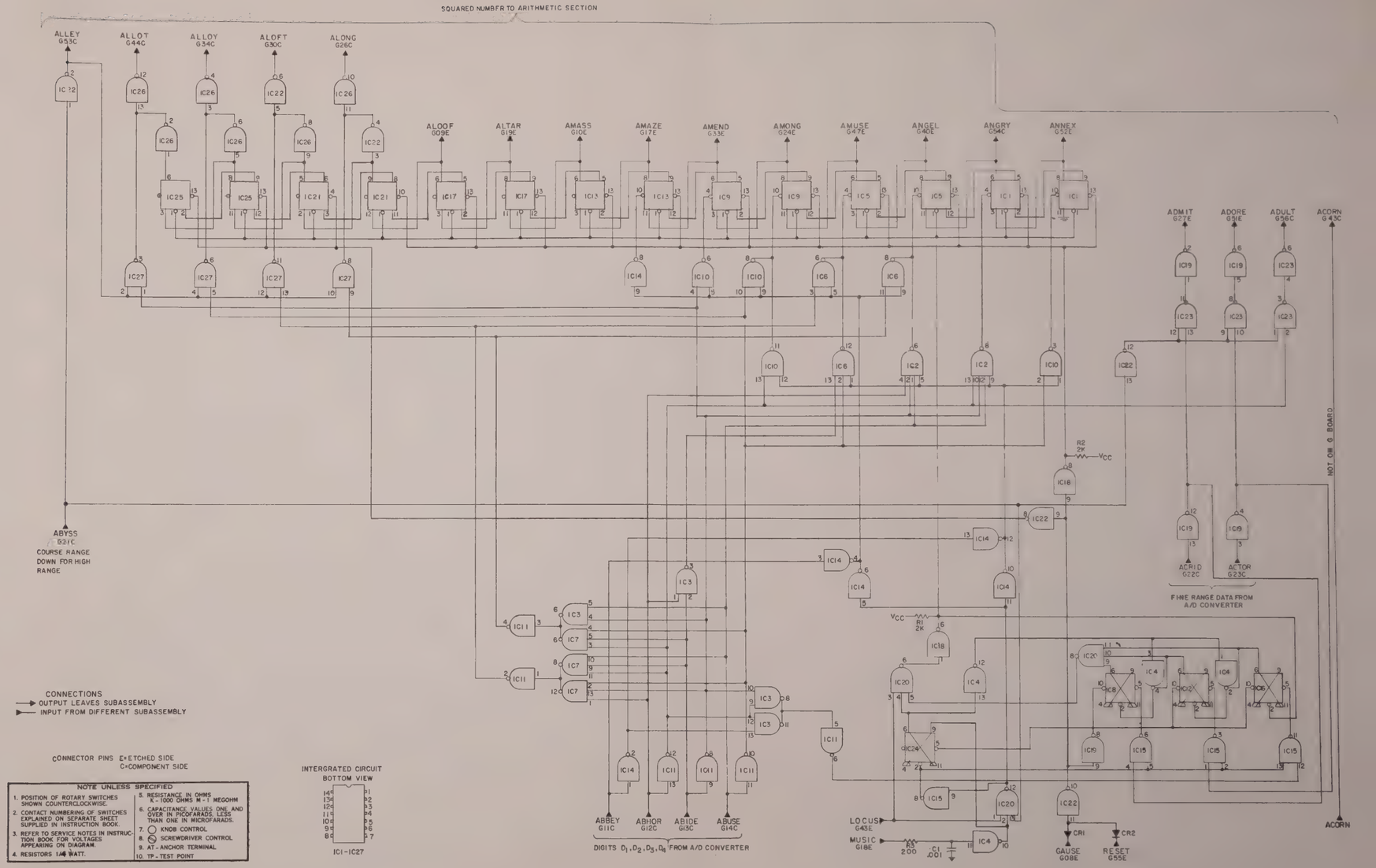


Figure 6-14. Schematic diagram of the squarer.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Electrolytic 4.7 µF 20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C2	Electrolytic 10 µF 20% 20 V	4450-5100	56289	150D106X0020B2	5910-855-6343
C3	Electrolytic 10 µF 20% 20 V	4450-5100	56289	150D106X0020B2	5910-855-6343
C4	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C5	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C6	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C7	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C8	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C9	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C10	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C11	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C12	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C13	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C14	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C15	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C16	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C17	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C18	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C19	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
INTEGRATED CIRCUITS					
IC1	Type 946	5431-9462	07263	DTµL-946	
IC2	Type 946	5431-9462	07263	DTµL-946	
IC3	Type 946	5431-9462	07263	DTµL-946	
IC4	Type 946	5431-9462	07263	DTµL-946	
IC5	Type 946	5431-9462	07263	DTµL-946	
IC6	Type 946	5431-9462	07263	DTµL-946	
IC7	Type 946	5431-9462	07263	DTµL-946	
IC8	Type 946	5431-9462	07263	DTµL-946	
IC9	Type 946	5431-9462	07263	DTµL-946	
IC10	Type 946	5431-9462	07263	DTµL-946	
IC11	Type 946	5431-9462	07263	DTµL-946	
IC12	Type 946	5431-9462	07263	DTµL-946	
IC13	Type 946	5431-9462	07263	DTµL-946	
IC14	Type 946	5431-9462	07263	DTµL-946	
IC15	Type 946	5431-9462	07263	DTµL-946	
IC16	Type 946	5431-9462	07263	DTµL-946	
IC17	Type 946	5431-9462	07263	DTµL-946	
IC18	Type 946	5431-9462	07263	DTµL-946	
IC19	Type 949	5431-9492	07263	DTµL-949	
IC20	Type 949	5431-9492	07263	DTµL-949	
IC21	Type 949	5431-9492	07263	DTµL-949	
IC22	Type 949	5431-9492	07263	DTµL-949	
IC23	Type 949	5431-9492	07263	DTµL-949	
IC24	Type 949	5431-9492	07263	DTµL-949	
IC25	Type MM504	5431-9606	42498	MM504	
IC26	Type MM504	5431-9606	42498	MM504	
IC27	Type MM504	5431-9606	42498	MM504	
IC28	Type MM504	5431-9606	42498	MM504	
IC29	Type MM504	5431-9606	42498	MM504	
IC30	Type MM504	5431-9606	42498	MM504	
IC31	Type MM504	5431-9606	42498	MM504	
IC32	Type MM504	5431-9606	42498	MM504	
IC33	Type MM504	5431-9606	42498	MM504	
IC34	Type MM504	5431-9606	42498	MM504	
IC35	Type MM504	5431-9606	42498	MM504	
IC36	Type MM504	5431-9606	42498	MM504	
IC37	Type SN7483N	5431-8183	96214	SN7483N	
IC38	Type SN7483N	5431-8183	96214	SN7483N	
IC39	Type SN7473N	5431-8173	96214	SN7473N	
IC40	Type SN7473N	5431-8173	96214	SN7473N	
IC41	Type SN7473N	5431-8173	96214	SN7473N	
IC42	Type SN7473N	5431-8173	96214	SN7473N	
IC43	Type SN7473N	5431-8173	96214	SN7473N	
IC44	Type SN7473N	5431-8173	96214	SN7473N	
IC45	Type SN7473N	5431-8173	96214	SN7473N	
IC46	Type SN7473N	5431-8173	96214	SN7473N	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS					
R1	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R2	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R3	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R4	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R5	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R6	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R7	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R8	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R9	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R10	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R11	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R12	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R13	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R14	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R15	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R16	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R17	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R18	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R19	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R20	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R21	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R22	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R23	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R24	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R25	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R26	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R27	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	5905-702-4439
R28	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	5905-702-4439
R29	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R30	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R31	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R32	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R33	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R34	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R35	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R36	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R37	Composition 24 k ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R38	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R39	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R40	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R41	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R42	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R43	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R44	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R45	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R46	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R47	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R48	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R49	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R50	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R51	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R52	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R53	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R54	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R55	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R56	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
TRANSISTORS					
Q1	Type 2N4125	8210-1125	93916	2N4125	
Q2	Type 2N4125	8210-1125	93916	2N4125	
Q3	Type 2N4125	8210-1125	93916	2N4125	
Q4	Type 2N4125	8210-1125	93916	2N4125	
Q5	Type 2N4125	8210-1125	93916	2N4125	
Q6	Type 2N4125	8210-1125	93916	2N4125	
Q7	Type 2N4125	8210-1125	93916	2N4125	
Q8	Type 2N4125	8210-1125	93916	2N4125	
Q9	Type 2N4124	8210-1154	93916	2N4124	
Q10	Type 2N4124	8210-1154	93916	2N4124	
Q11	Type 2N4124	8210-1154	93916	2N4124	
Q12	Type 2N4124	8210-1154	93916	2N4124	
Q13	Type 2N4124	8210-1154	93916	2N4124	
Q14	Type 2N4124	8210-1154	93916	2N4124	
Q15	Type 2N4124	8210-1154	93916	2N4124	
Q16	Type 2N4124	8210-1154	93916	2N4124	

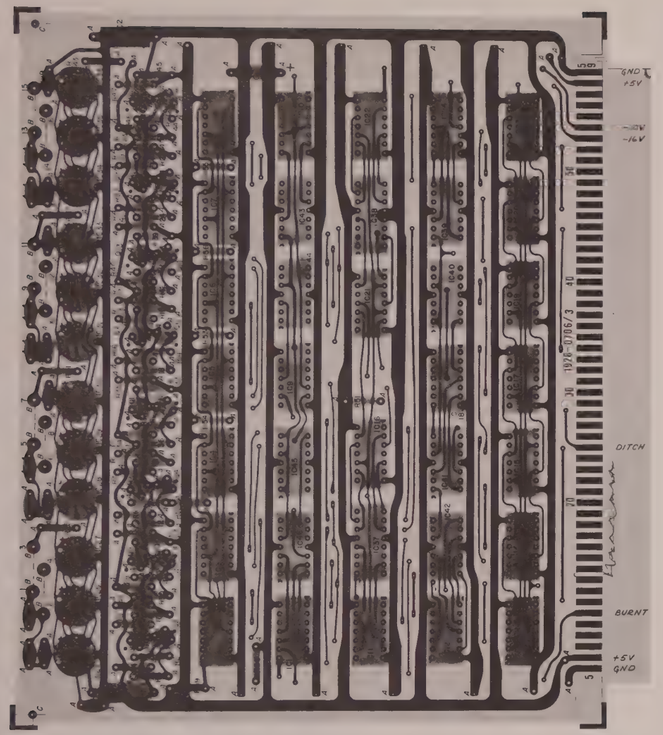


Figure 6-15. Etched-board assemblies for arithmetic slice 1, boards H (30 channels) and HH (45 channels). Complete boards are P/N 1926-4706 and 1926-4707, respectively. See note.

Board HH not used in Type 1909 Analyzer.

NOTE

Circuit shown is for 45-channel board (HH). For 30-channel board (H), delete IC27, 30, 33, and 36, and add jumpers between the following anchor terminals (as per the dotted lines):

1 to 3	9 to 11
2 to 4	10 to 12
5 to 7	13 to 15
6 to 8	14 to 15

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

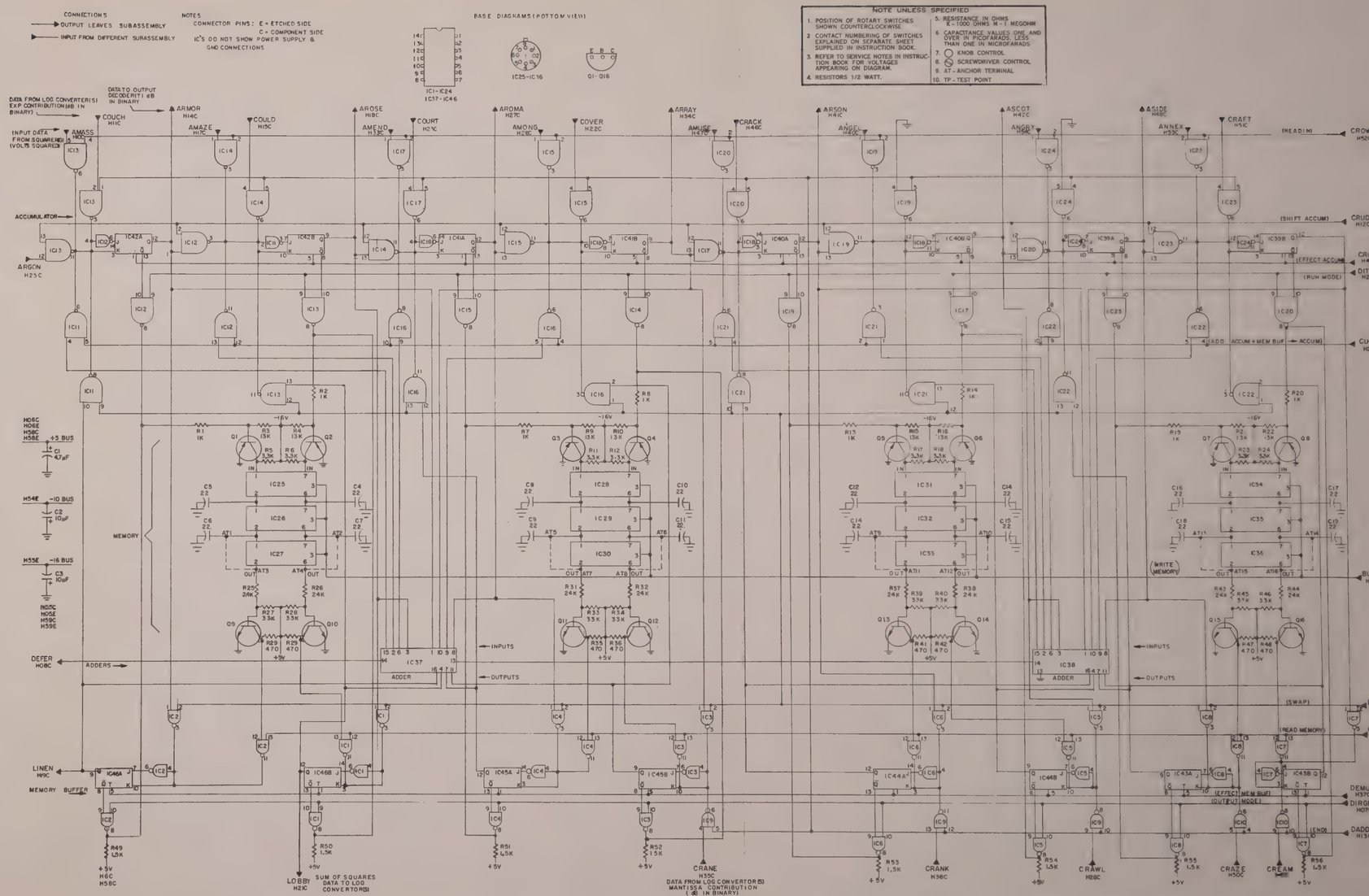


Figure 6-16. Schematic diagram of arithmetic slice 1. See note with Figure 6-15.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Electrolytic 4.7 µF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C2	Electrolytic 10 µF ±20% 20 V	4450-5100	56289	150D106X0020B2	5910-855-8343
C3	Electrolytic 10 µF ±20% 20 V	4450-5100	56289	150D106X0020B2	5910-855-8343
C4	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C5	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C6	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C10	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C11	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C12	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C13	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C14	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C15	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C16	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C17	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C18	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C19	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
INTEGRATED CIRCUITS					
IC1	Type 949	5431-9492	07263	DTµL-949	
IC2	Type 949	5431-9492	07263	DTµL-949	
IC3	Type 949	5431-9492	07263	DTµL-949	
IC4	Type 949	5431-9492	07263	DTµL-949	
IC5	Type 949	5431-9492	07263	DTµL-949	
IC6	Type 949	5431-9492	07263	DTµL-949	
IC7	Type 949	5431-9492	07263	DTµL-949	
IC8	Type 949	5431-9492	07263	DTµL-949	
IC9	Type 949	5431-9492	07263	DTµL-949	
IC10	Type 937	5431-9372	07263	DTµL-937	
IC11	Type 949	5431-9492	07263	DTµL-949	
IC12	Type 949	5431-9492	07263	DTµL-949	
IC13	Type 949	5431-9492	07263	DTµL-949	
IC14	Type 949	5431-9492	07263	DTµL-949	
IC15	Type 949	5431-9492	07263	DTµL-949	
IC16	Type 949	5431-9492	07263	DTµL-949	
IC17	Type 949	5431-9492	07263	DTµL-949	
IC18	Type 949	5431-9492	07263	DTµL-949	
IC19	Type MM504	5431-9606	42498	MM504	
IC20	Type MM504	5431-9606	42498	MM504	
IC21	Type MM504	5431-9606	42498	MM504	
IC22	Type MM504	5431-9606	42498	MM504	
IC23	Type MM504	5431-9606	42498	MM504	
IC24	Type MM504	5431-9606	42498	MM504	
IC25	Type MM504	5431-9606	42498	MM504	
IC26	Type MM504	5431-9606	42498	MM504	
IC27	Type MM504	5431-9606	42498	MM504	
IC28	Type MM504	5431-9606	42498	MM504	
IC29	Type MM504	5431-9606	42498	MM504	
IC30	Type MM504	5431-9606	42498	MM504	
IC31	Type SN7473N	5431-8183	96214	SN7483N	
IC32	Type SN7473N	5431-8183	96214	SN7483N	
IC33	Type SN7473N	5431-8173	96214	SN7473N	
IC34	Type SN7473N	5431-8173	96214	SN7473N	
IC35	Type SN7473N	5431-8173	96214	SN7473N	
IC36	Type SN7473N	5431-8173	96214	SN7473N	
IC37	Type SN7473N	5431-8173	96214	SN7473N	
IC38	Type SN7473N	5431-8173	96214	SN7473N	
IC39	Type SN7473N	5431-8173	96214	SN7473N	
IC40	Type SN7473N	5431-8173	96214	SN7473N	
RESISTORS					
R1	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R2	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R3	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R4	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R5	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±5%	
R6	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±5%	
R7	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R8	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R9	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R10	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R11	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R12	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R13	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R14	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R15	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R16	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R17	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R18	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R19	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R20	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R21	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R22	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R23	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R24	Composition 3,3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3,3 kΩ ±10%	
R25	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R26	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R27	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R28	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R29	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R30	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R31	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R32	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R33	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R34	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R35	Composition 470 Ω ±5% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R36	Composition 470 Ω ±5% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R37	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R38	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R39	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R40	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R41	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R42	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R43	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R44	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R45	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R46	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R47	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R48	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R49	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R50	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R51	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R52	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R53	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R54	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
R55	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75041	BTS, 1,5 kΩ ±5%	
R56	Composition 1,5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1,5 kΩ ±5%	
TRANSISTORS					
Q1	Type 2N4125	8210-1125	93916	2N4125	
Q2	Type 2N4125	8210-1125	93916	2N4125	
Q3	Type 2N4125	8210-1125	93916	2N4125	
Q4	Type 2N4125	8210-1125	93916	2N4125	
Q5	Type 2N4125	8210-1125	93916	2N4125	
Q6	Type 2N4125	8210-1125	93916	2N4125	
Q7	Type 2N4125	8210-1125	93916	2N4125	
Q8	Type 2N4125	8210-1125	93916	2N4125	
Q9	Type 2N4124	8210-1154	93916	2N4124	
Q10	Type 2N4124	8210-1154	93916	2N4124	
Q11	Type 2N4124	8210-1154	93916	2N4124	
Q12	Type 2N4124	8210-1154	93916	2N4124	
Q13	Type 2N4124	8210-1154	93916	2N4124	
Q14	Type 2N4124	8210-1154	93916	2N4124	
Q15	Type 2N4124	8210-1154	93916	2N4124	
Q16	Type 2N4124	8210-1154	93916	2N4124	

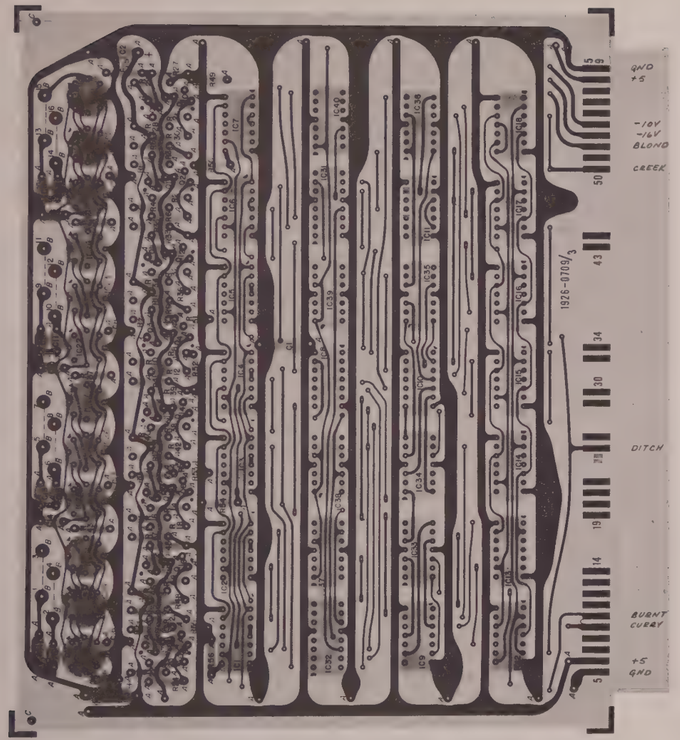


Figure 6-17. Etched-board assemblies for arithmetic slice 2, boards J (30 channels) and JJ (45 channels). Complete boards are P/N 1926-4709 and 1926-4710, respectively. See note.

Board JJ not used in Type 1909 Analyzer.

NOTE

Circuit shown is for 45-channel board (JJ). For 30-channel board (J), delete IC24, 27, and 30, and add jumpers between the following anchor terminals (as per the dotted lines):

1 to 3	9 to 11
2 to 4	10 to 12
5 to 7	13 to 15
6 to 8	14 to 16

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

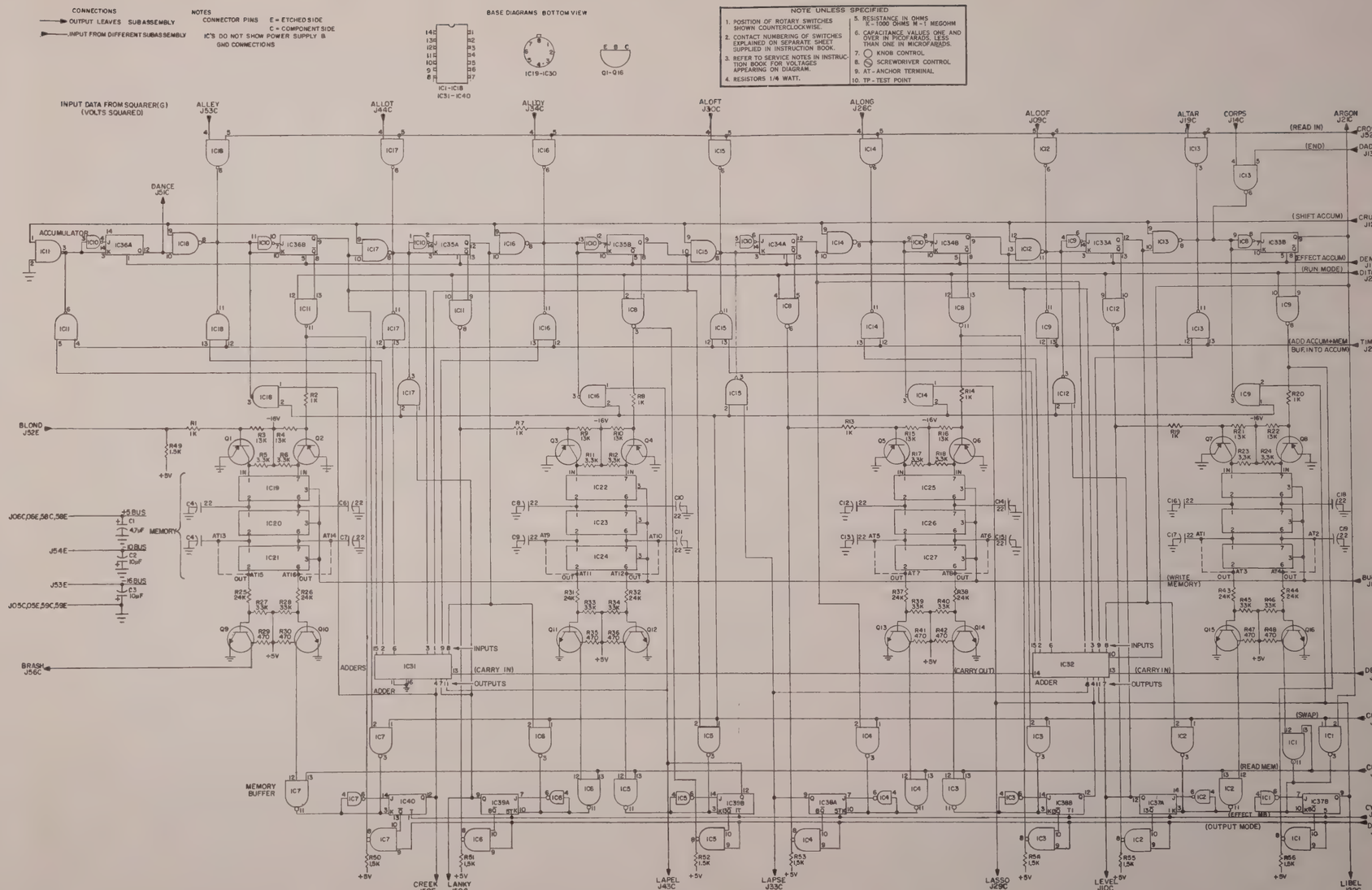


Figure 6-18. Schematic diagram of arithmetic slice 2. See note with Figure 6-17.

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Electrolytic 4.7 µF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C2	Electrolytic 4.7 µF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C3	Electrolytic 4.7 µF ±20% 10 V	4450-5100	56289	150D106X0020B2	5910-855-6343
C4	Electrolytic 4.7 µF ±20% 10 V	4450-5100	56289	150D106X0020B2	5910-855-6343
C5	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C6	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C7	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C8	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C9	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C10	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C11	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C12	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
INTEGRATED CIRCUITS					
IC1	Type 946	5431-9462	07263	DTµL-946	
IC2	Type 946	5431-9462	07263	DTµL-946	
IC3	Type 946	5431-9462	07263	DTµL-946	
IC4	Type 946	5431-9462	07263	DTµL-946	
IC5	Type 946	5431-9462	07263	DTµL-946	
IC6	Type 946	5431-9462	07263	DTµL-946	
IC7	Type 946	5431-9462	07263	DTµL-946	
IC8	Type 946	5431-9462	07263	DTµL-946	
IC9	Type 946	5431-9462	07263	DTµL-946	
IC10	Type 946	5431-9462	07263	DTµL-946	
IC11	Type 949	5431-9462	07263	DTµL-949	
IC12	Type 949	5431-9462	07263	DTµL-949	
IC13	Type SN7473N	5431-8173	96214	SN7473N	
IC14	Type SN7473N	5431-8173	96214	SN7473N	
IC15	Type SN7473N	5431-8173	96214	SN7473N	
IC16	Type SN7473N	5431-8183	96214	SN7473N	
IC17	Type MM504	5431-9606	42498	MM504	
IC18	Type MM504	5431-9606	42498	MM504	
IC19	Type MM504	5431-9606	42498	MM504	
IC20	Type MM504	5431-9606	42498	MM504	
IC21	Type MM504	5431-9606	42498	MM504	
IC22	Type MM504	5431-9606	42498	MM504	
IC23	Type SN7430N	5431-8130	96214	SN7430N	
IC24	Type SN7483N	5431-8183	96214	SN7483N	
IC25	Type SN7482N	5431-8182	96214	SN7472N	
IC26	Type SN7473N	5431-8173	96214	SN7473N	
IC27	Type SN7473N	5431-8173	96214	SN7473N	
IC28	Type SN7473N	5431-8173	96214	SN7473N	
RESISTORS					
R1	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R2	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R3	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R4	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R5	Composition 3.3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3.3 k Ω ±10%	
R6	Composition 3.3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3.3 kΩ ±10%	
R7	Composition 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R8	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R9	Composition 13 kΩ ±5% 1/4 W	6099-3135	75042	BTS, 13 kΩ ±5%	5905-702-4439
R10	Composition 1 kΩ ±5% 1/4 W	6099-2125	75042	BTS, 1 kΩ ±5%	5905-681-6462
R11	Composition 3.3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3.3 kΩ ±10%	5905-681-6462
R12	Composition 3.3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3.3 kΩ ±10%	
R13	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R14	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R15	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R16	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R17	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R18	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R19	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R20	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R21	Composition 33 kΩ ±5% 1/4 W	6099-3335	75042	BTS, 33 kΩ ±5%	
R22	Composition 24 kΩ ±5% 1/4 W	6099-3245	75042	BTS, 24 kΩ ±5%	
R23	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R24	Composition 470 Ω ±10% 1/4 W	6099-1479	75042	BTS, 470 Ω ±10%	
R25	Composition 1.5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1.5 kΩ ±5%	
R26	Composition 1.5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1.5 kΩ ±5%	
R27	Composition 1.5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1.5 kΩ ±5%	
R28	Composition 1.5 kΩ ±5% 1/4 W	6099-2155	75042	BTS, 1.5 kΩ ±5%	
TRANSISTORS					
Q1	Type 2N4125	8210-1125	93916	2N4125	
Q2	Type 2N4125	8210-1125	93916	2N4125	
Q3	Type 2N4125	8210-1125	93916	2N4125	
Q4	Type 2N4125	8210-1125	93916	2N4125	
Q5	Type 2N4124	8210-1154	93916	2N4124	
Q6	Type 2N4124	8210-1154	93916	2N4124	
Q7	Type 2N4124	8210-1154	93916	2N4124	
Q8	Type 2N4124	8210-1154	93916	2N4124	

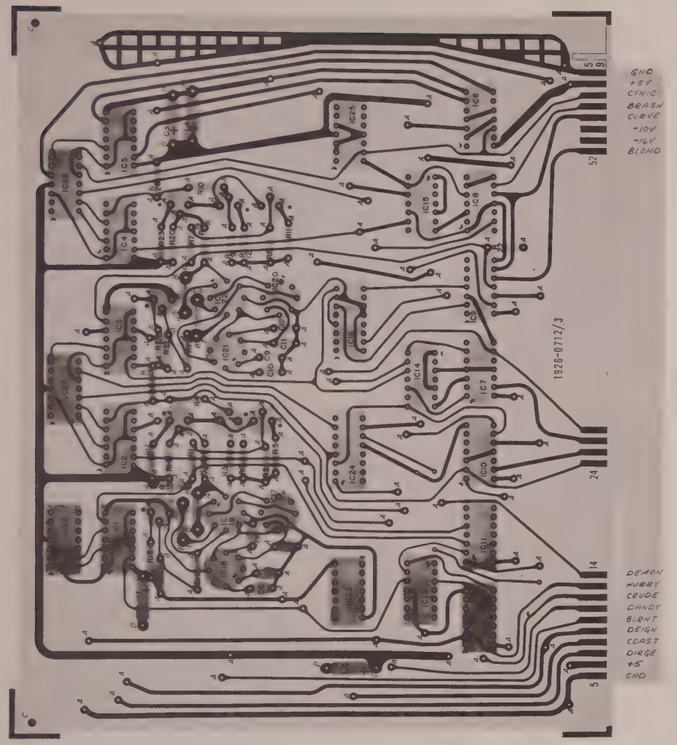


Figure 6-19. Etched-board assemblies for arithmetic slice 3, boards K (30 channels) and KK (45 channels). Complete boards are P/N 1926-4712 and 1926-4713, respectively. See note.

Board KK not used in Type 1909 Analyzer.

NOTE

Circuit shown is for 45-channel board (KK). For 30-channel board (K), delete IC19 and IC22, and add jumpers between the following anchor terminals (as per the dotted lines):

1 to 2	5 to 6
3 to 4	7 to 8

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

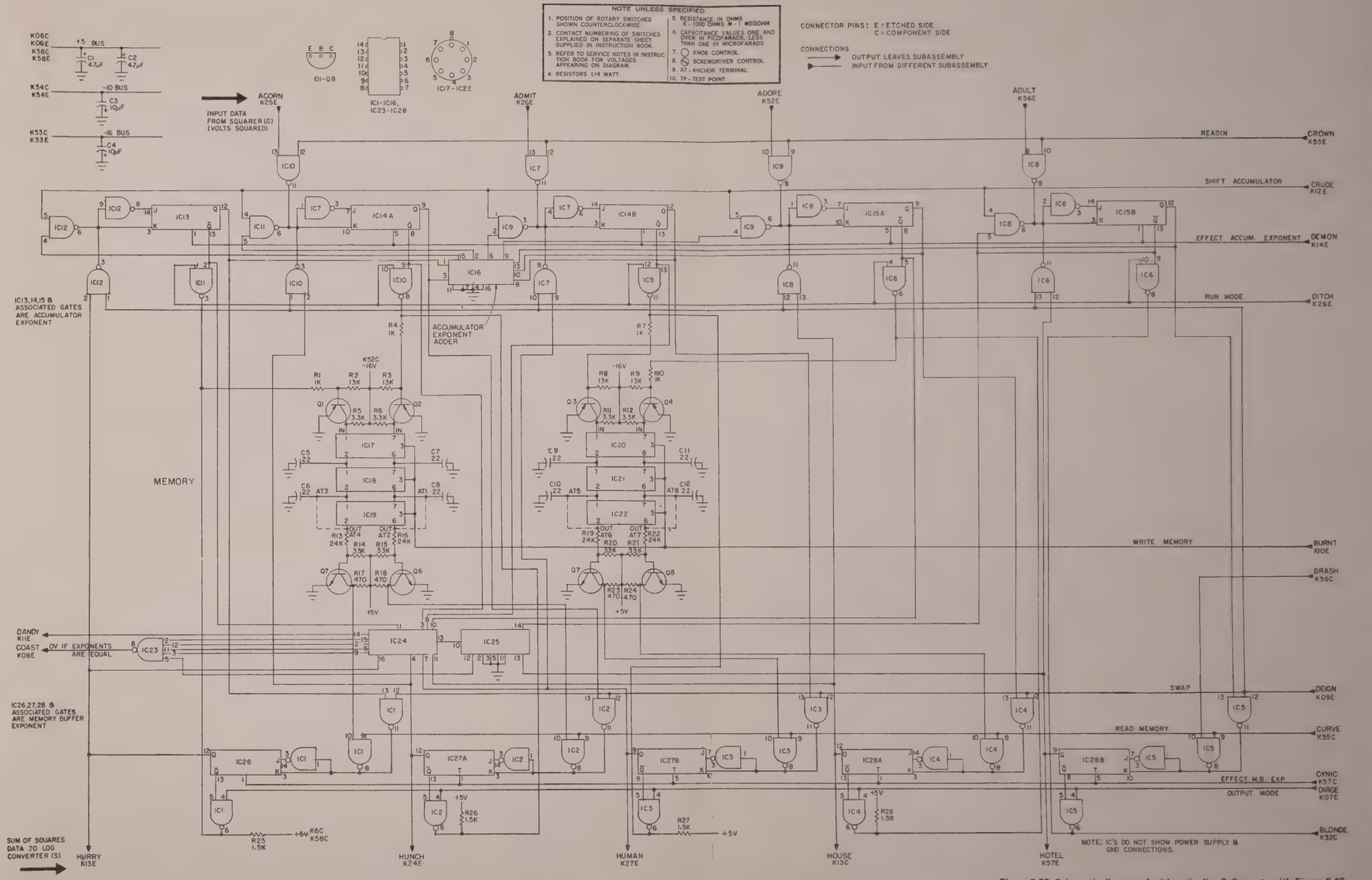


Figure 6-20. Schematic diagram of arithmetic slice 3. See note with Figure 6-19.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Ceramic, .001 µF +80 -20% 500 V	4404-2109	72982	831, .001 µF -20%	5910-983-9994
C2	Ceramic, 0.001 µF +80 -20% 500 V	4404-2109	72982	831, 0.001 µF -20%	5910-983-9994
C3	Ceramic, 47 pF ±10% 500 V	4404-0478	72982	831, 47 pF ±10%	
C4	Ceramic, 220 pF ±5% 500 V	4404-1225	72982	831, 220 pF ±5%	
C5	Ceramic, .001 µF +80 -20% 500 V	4404-2109	72982	831, .001 µF +80 -20% 500V	5910-983-9994
C6	Ceramic, .001 µF +80 -20% 500 V	4404-2109	72982	831, .001 µF +80 -20% 500V	5910-983-9994
C7	Ceramic, 2.2 µF ±20% 25 V	4400-2080	80183	5C13, 2.2 µF ±20%	
C8	Ceramic, .001 µF +80 -20% 500 V	4404-2109	72982	831, .001 µF +80 -20% 500V	5910-983-9994
C9	Ceramic, 0.1 µF ±20% 25 V	4400-2050	80183	5C13, .1 µF ±20%	5910-974-5695
C10	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C11	Mica, 330 pF ±10% 500 V	4620-1330	72136	CM15B, 330 pF ±10%	
C15	Ceramic, .001 µF +80 -20% 50 V	4404-2109	72982	831, .001 µF +80 -20%	5910-983-9994
C16	Electrolytic, 4.7 µF ±20% 50 V	4450-4990	56289	150D475X0050B2	
C17	Ceramic, 200 pF ±5% 500 V	4404-1205	72982	831, 200 pF ±5%	
C18	Ceramic, .0047 µF +5% 500 V	4407-2475	72982	841, .0047 µF ±5%	
C19	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C20	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C21	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C22	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C23	Electrolytic, 4.7 µF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C25	Mica, .0015 µF ±5% 500 V	4700-0690	14655	22A, .0015 µF ±5%	
C26	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C27	Ceramic, 0.1 µF ±20% 25 V	4400-2050	80183	5C13, .1 µF ±20%	5910-974-5695
C28	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C29	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C30	Ceramic, .01 µF +80 -20% 500 V	4406-3109	72982	811, .01 µF +80 -20%	5910-754-7049
C31	Ceramic, .001 µF +80 -20% 500 V	4404-2109	72982	831, .001 µF +80 -20%	5910-983-9994
C32	Ceramic, 470 pF ±10% 500 V	4404-1478	72982	831, 470 pF ±10%	
C33	Ceramic, 100 pF ±10% 500 V	4404-1108	72982	831, 100 pF ±10%	
C34	Ceramic, 470 pF ±10% 500 V	4404-1478	72982	831, 470 pF ±10%	
C35	Ceramic, 270 pF ±10% 500 V	4404-1278	72982	831, 270 pF ±10%	
DIODES					
CR1	Type 1N995	6082-1002	80368	1N995	
CR2	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR3	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR4	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR5	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR6	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR7	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR8	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR9	Type 1N750A	6083-1028	07910	1N750A	5960-754-5897
CR10	Type 1N750A	6083-1028	07910	1N750A	5960-754-5897
CR11	Type 1N995	6082-1002	80368	1N995	
CR12	Type 1N995	6082-1002	80368	1N995	
CR13	Type 1N995	6082-1002	80368	1N995	
CR14	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR16	Type 1N995	6082-1002	80368	1N995	
CR17	Type 1N995	6082-1002	80368	1N995	
CR18	Type 1N3253	6081-1001	79089	1N3253	5961-814-4251
CR19	Type 1N995	6082-1002	80368	1N995	
CR20	Type 1N995	6082-1002	80368	1N995	
CR21	Type 1N995	6082-1002	80368	1N995	
CR22	Type 1N995	6082-1002	80368	1N995	
CR23	Type 1N995	6082-1002	80368	1N995	
CR24	Type 1N995	6082-1002	80368	1N995	
CR25	Type 1N995	6082-1002	80368	1N995	
CR26	Type 1N995	6082-1002	80368	1N995	
CR28	Type 1N995	6082-1002	80368	1N995	
CR29	Type 1N995	6082-1002	80368	1N995	
CR30	Type 1N995	6082-1002	80368	1N995	
CR31	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR32	Type 1N995	6082-1002	80368	1N995	
CR33	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR34	Type 1N995	6082-1002	80368	1N995	
CR35	Type 1N995	6082-1002	80368	1N995	
CR36	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR37	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR38	Type 1N995	6082-1002	80368	1N995	
CR39	Type 1N995	6082-1001	80368	1N995	
CR40	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
INTEGRATED CIRCUITS					
1C1	Type SN7493N	5431-8193	96214	SN7493N	
1C2	Type 936	5431-9362	07263	DTµL-936	
1C3	Type 9112	5431-9112	07263	DTµL-911	
1C4	Type SN7476N	5431-8176	01295	SN7476N	
1C5	Type SN7493N	5431-8193	96214	SN7493N	
1C6	Type SN7493N	5431-8193	96214	SN7493N	
1C7	Type 951	5431-9512	07263	DTµL-951	
1C8	Type 936	5431-9362	07263	DTµL-936	
1C9	Type 946	5431-9462	07263	DTµL-946	
1C10	Type 962	5431-9622	07263	DTµL-962	
1C11	Type SN7476N	5431-8176	01295	SN7476N	
1C12	Type 946	5431-9462	07263	DTµL-946	
1C13	Type SN7493N	5431-8193	96214	SN7493N	
1C14	Type 930	5431-9302	07263	NTµL-930	
1C15	Type SN7401N	5431-8101	96214	SN7401N	
1C16	Type SN7472N	5431-8172	96214	SN7472N	
1C17	Type SN7493N	5431-8193	96214	SN7493N	
1C18	Type 946	5431-9462	07263	DTµL-946	
1C19	Type 936	5431-9362	07263	DTµL-936	
1C20	Type 932	5431-9322	07263	DTµL-932	
1C21	Type 946	5431-9462	07263	DTµL-946	
1C22	Type SN7493N	5431-8193	96214	SN7493N	
1C23	Type 930	5431-9302	07263	NTµL-930	
1C24	Type SN7401N	5431-8101	96214	SN7401N	
1C25	Type 936	5431-9362	07263	DTµL-936	
1C26	Type 936	5431-9362	07263	DTµL-936	
1C27	Type 946	5431-9462	07263	DTµL-946	
1C28	Type 946	5431-9462	07263	DTµL-946	
1C29	Type SN7476N	5431-8176	01295	SN7476N	
1C30	Type 932	5431-9322	07263	DTµL-932	
IC31	Type 962	5431-8110	96214	SN7410N	
1C32	Type 962	5431-9622	07263	DTµL-962	
1C33	Type 709C	5432-7091	07263	MC1709CG	
RESISTORS					
R1	Composition, 22 Ω ±5% 1/4 W	6099-0225	75042	BTS, 22 Ω ±5%	5905-279-5459
R2	Composition, 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R3	Composition, 750 Ω ±5% 1/4 W	6099-1755	75042	BTS, 750 Ω ±5%	
R4	Composition, 390 Ω ±5% 1/4 W	6099-1395	75042	BTS, 390 Ω ±5%	
R5	Composition, 1.6 kΩ ±5% 1/4 W	6099-2165	75042	BTS, 1.6 kΩ ±5%	
R6	Composition, 1.1 kΩ ±5% 1/4 W	6099-2115	75042	BTS, 1.1 kΩ ±5%	
R7	Composition, 2.4 kΩ ±5% 1/4 W	6099-2245	75042	BTS, 2.4 kΩ ±5%	5905-683-7724
R8	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R9	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R10	Composition, 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R11	Composition, 470 Ω ±5% 1/4 W	6099-1475	75042	BTS, 470 Ω ±5%	5905-683-2242
R13	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R14	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R15	Composition, 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R16	Composition, 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R17	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R18	Composition, 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R19	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R20	Composition, 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R21	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R22	Composition, 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R23	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R24	Composition, 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R25	Composition, 47 Ω ±5% 1/4 W	6099-0475	75042	BTS, 47 Ω ±5%	
R30	Composition, 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R31	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R32	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R33	Composition, 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R34	Composition, 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R35	Composition, 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R36	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R37	Composition, 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R38	Composition, 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R39	Composition, 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R40	Composition, 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R42	Pot. Comp., 5 kΩ ±10%	6049-0217	01121	SV5021	
R43	Composition, 3 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R44	Composition, 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R45	Composition, 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R46	Composition, 1 kΩ +5% 1/4 W	6099-2105	75042	BTS, 1 kΩ +5%	5905-681-6462
R47	Composition, 2.4 kΩ +5% 1/4 W	6099-2245	75042	BTS, 2.4 kΩ +5%	5905-683-7724
R48	Composition, 51 Ω +5% 1/4 W	6099-0515	75042	BTS, 51 Ω +5%	
R49	Composition, 1.5 kΩ +5% 1/4 W	6099-2155	75042	BTS, 1.5 kΩ +5%	
R50	Composition, 10 kΩ +5% 1/4 W	6099-3105	75042	BTS, 10 kΩ +5%	5905-683-2238
R51	Composition, 47 Ω +5% 1/4 W	6099-0475	75042	BTS, 47 Ω +5%	
R52	Composition, 47 Ω +5% 1/4 W	6099-0475	75042	BTS, 47 Ω +5%	
R53	Composition, 10 kΩ +5% 1/4 W	6099-3105	75042	BTS, 10 kΩ +5%	5905-683-2238
R57	Composition, 5.6 kΩ +5% 1/4 W	6099-2565	75042	BTS, 5.6 kΩ +5%	5905-691-0195
R60	Composition, 10 kΩ +5% 1/4 W	6099-3105	75042	BTS, 10 kΩ +5%	5905-683-2238
R61	Composition, 10 kΩ +5% 1/4 W	6099-3105	75042	BTS, 10 kΩ +5%	5905-683-2238
R62	Composition, 220 Ω +5% 1/4 W	6099-1225	75042	BTS, 220 Ω +5%	5905-683-2240
R63	Composition, 1 kΩ +5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R64	Pot. Comp., 10 kΩ ±10%	6049-0220	01121	SV5031	
R65	Composition, 2.2 k ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R66	Composition, 2.2 k ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R67	Composition, 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R68	Composition, 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R69	Composition, 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R70	Composition, 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R71	Composition, 2.7 kΩ ±5% 1/4 W	6099-2275	75042	BTS, 2.7 kΩ ±5%	
R72	Composition, 2.7 kΩ ±5% 1/4 W	6099-2275	75042	BTS, 2.7 kΩ ±5%	
TRANSISTORS					
Q1	Type 2N4124	8210-1154	93916	2N4124	
Q2	Type 2N4124	8210-1154	93916	2N4124	
Q3	Type 2N4124	8210-1154	93916	2N4124	
Q7	Type 2N1131	8210-1025	96214	2N1131	5960-788-8644
Q8	Type 2N4384	8210-1114	93916	2N4384	
Q9	Type 2N3905	8210-1114	04713	2N3905	
Q10	Type 2N4416	8210-1142	83740	2N4416	

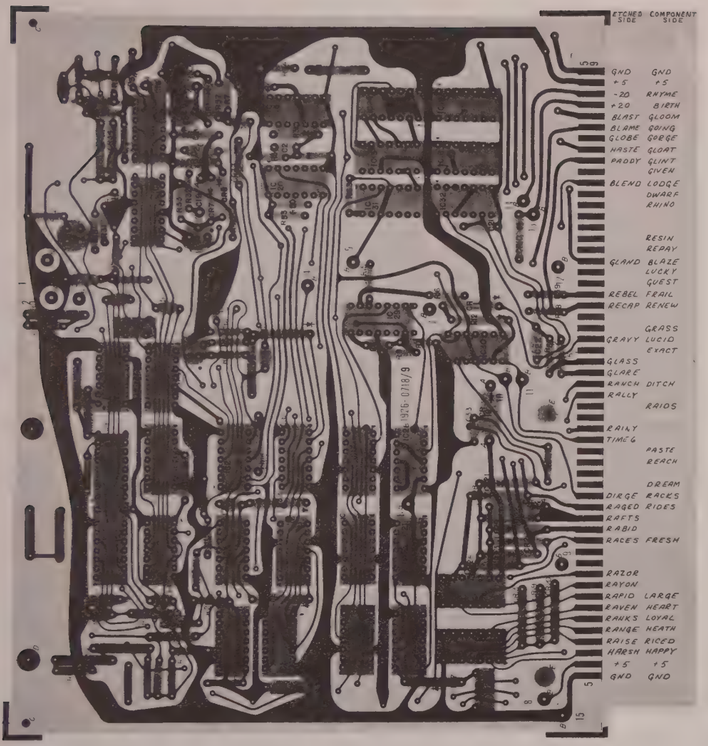


Figure 6-21. Etched-board assembly for system control 2 (board L). Complete board is P/N 1926-4718. See, also, Figure 6-23.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

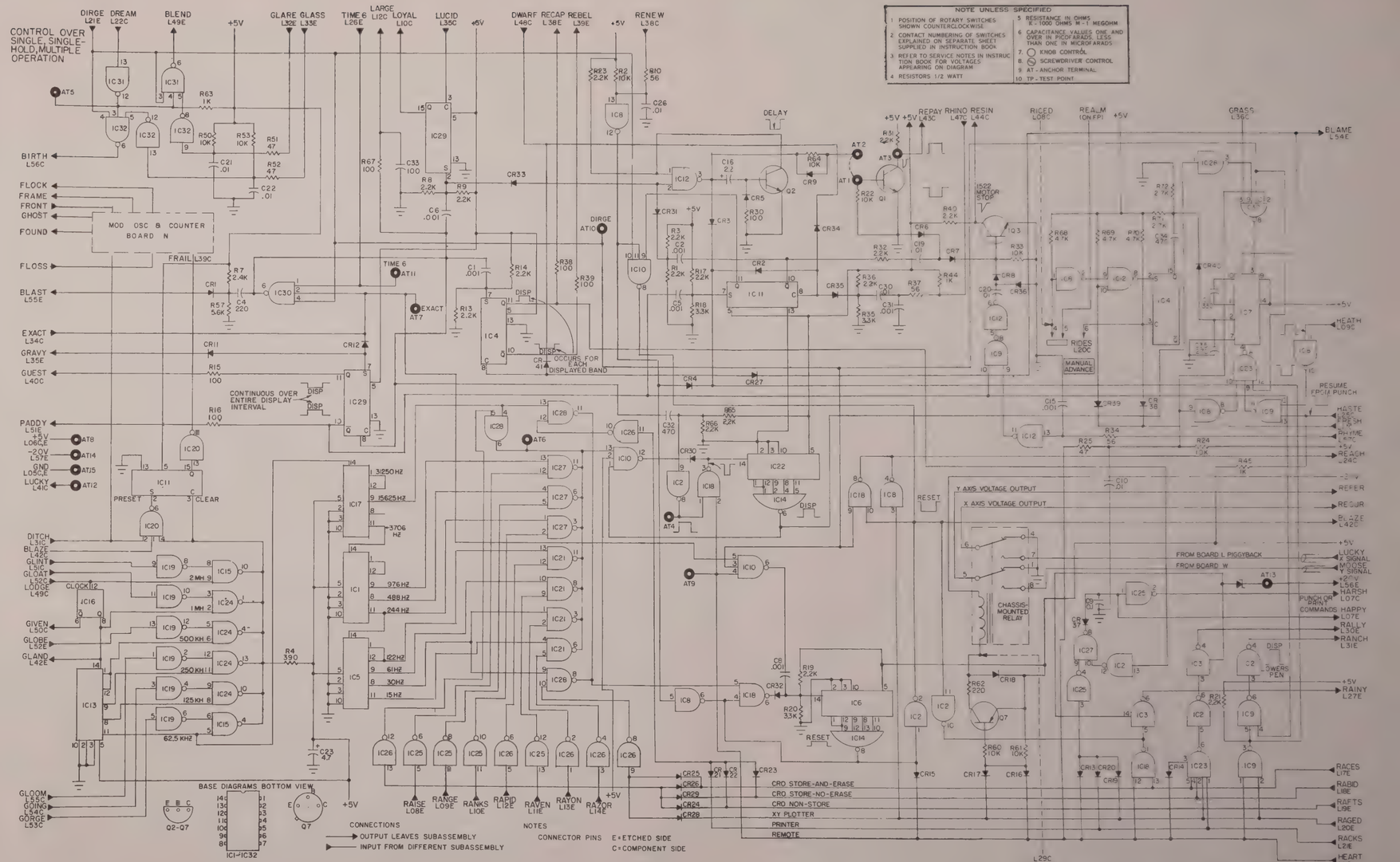

CONTROL OVER SINGLE, SINGLE-HOLD, MULTIPLE OPERATION
NOTE UNLESS SPECIFIED
1 POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE
2 CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK
3 REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM
4 RESISTORS 1/2 WATT
5 RESISTANCE IN OHMS K - 1000 OHMS M - 1 MEGOHM
6 CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS
7 KNOB CONTROL
8 SCREWDRIVER CONTROL
9 AT - ANCHOR TERMINAL
10 TP - TEST POINT
DELAY
MOD OSC & COUNTER BOARD N
FRAIL L39C
DISP OCCURS FOR EACH DISPLAYED BAND
CONTINUOUS OVER ENTIRE DISPLAY INTERVAL
PRESET
CLEAR
CHASSIS-MOUNTED RELAY
MANUAL ADVANCE
Y AXIS VOLTAGE OUTPUT
X AXIS VOLTAGE OUTPUT
BASE DIAGRAMS BOTTOM VIEW
IC1-IC32
Q2-Q7
Q7
CONNECTIONS
OUTPUT LEAVES SUBASSEMBLY
INPUT FROM DIFFERENT SUBASSEMBLY
NOTES
CONNECTOR PINS E=ETCHED SIDE C=COMPONENT SIDE
CRO STORE-AND-ERASE
CRO STORE-NO-STORE
CRO NON-STORE
XY PLOTTER
PRINTER
REMOTE
L29C RAIDS

Figure 6-22. Schematic diagram of system control 2. See, also, Figure 6-24.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Ceramic, 0.001 µF ±20%	4404-2100	72982	831, 0.001 µF ±20%	
C2	Ceramic, 22 pF ±10%	4404-0228	72982	831, 22 pF ±10%	
C3	Ceramic, 0.01 µF +80-20%	4401-3100	80131	CC61, 0.01 µF +80-20%	5910-974-5697
C4 5+6	Electrolytic, 2.2 µF ±20%	4450-4500	56289	150D225X0020A2	5910-976-4604
C7	Ceramic, 100 pF ±10%	4404-1108	72982	831, 100 pF ±10%	
INTEGRATED CIRCUITS					
IC1	Digital	5431-9112	07263	DTµL-9112	
IC2,3	Digital	5431-8193	96214	SN7493N	
IC4	Digital	5431-9112	07263	DTµL-9112	
IC5	Digital	5431-8193	96214	SN7493N	
IC6	Digital	5431-9362	07263	DTµL-936	
IC7	Digital	5431-9302	07263	DTµL-930	
IC8	Digital	5431-9622	07263	DTµL-962	
IC9	Linear	5432-1004	12040	LM301A	
DIODES					
CR1,2+3	Type 1N995	6082-1002	80368	1N995	5961-893-6762
CR4,5+6	Type 1N750A	6083-1028	07910	1N750A	5960-754-5897
RESISTORS					
R1 thru R10	Composition, 24 kΩ ±5%	6099-2245	75042	BTS, 2.4 kΩ 5%	5905-683-7724
R11	Composition, 1 kΩ ±5%	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6422
R12	Composition, 4.7 kΩ ±5%	6099-2475	75042	BTS, 4.7 kΩ 5%	5905-686-9992
R13	Composition, 51 kΩ ±5%	6099-2515	75042	BTS, 5.1 kΩ 5%	5905-683-2241
R14	Composition, 51 Ω ±5%	6099-0515	75042	BTS, 51 Ω ±5%	
R15	Film, 200 Ω ±1%	6250-0200	75042	CEA, 200 Ω 1%	
R16	Potentiometer, 50 Ω ±10%	6049-0182	80294	3009P, 50 Ω ±10%	
R17	Film, 182 Ω ±1%	6250-0182	75042	CEA, 182 Ω 1%	
R18	Film, 121 Ω +1%	6250-0121	75042	CEA, 121 Ω 1%	
R19	Pot. Wire Wound, 500 Ω ±10%	6051-1509	02660	2600PC, 500 Ω ±10%	
R20,21, 22	Composition, 3 kΩ ±5%	6099-2305	75042	BTS, 3 kΩ 5%	5905-682-4097
BINARY LADDER					
BL-1	Low Power Wire Wound, Binary Ladder	6740-2050	30646	811	
	Integrated Cir.	7540-3436	05748	041-001-111	
	Transistor	7540-3467	91506	#8058-1G32	
TRANSISTORS					
Q1 thru Q20	Type 2N3414	8210-1047	24446	2N3414	5961-989-2749

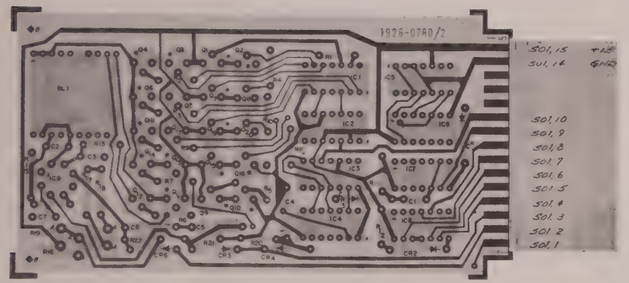


Figure 6-23. Etched-board assembly for system control 2 ("piggy-back" board L). Complete board is P/N 1926-4760. See, also, Figure 6-21.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

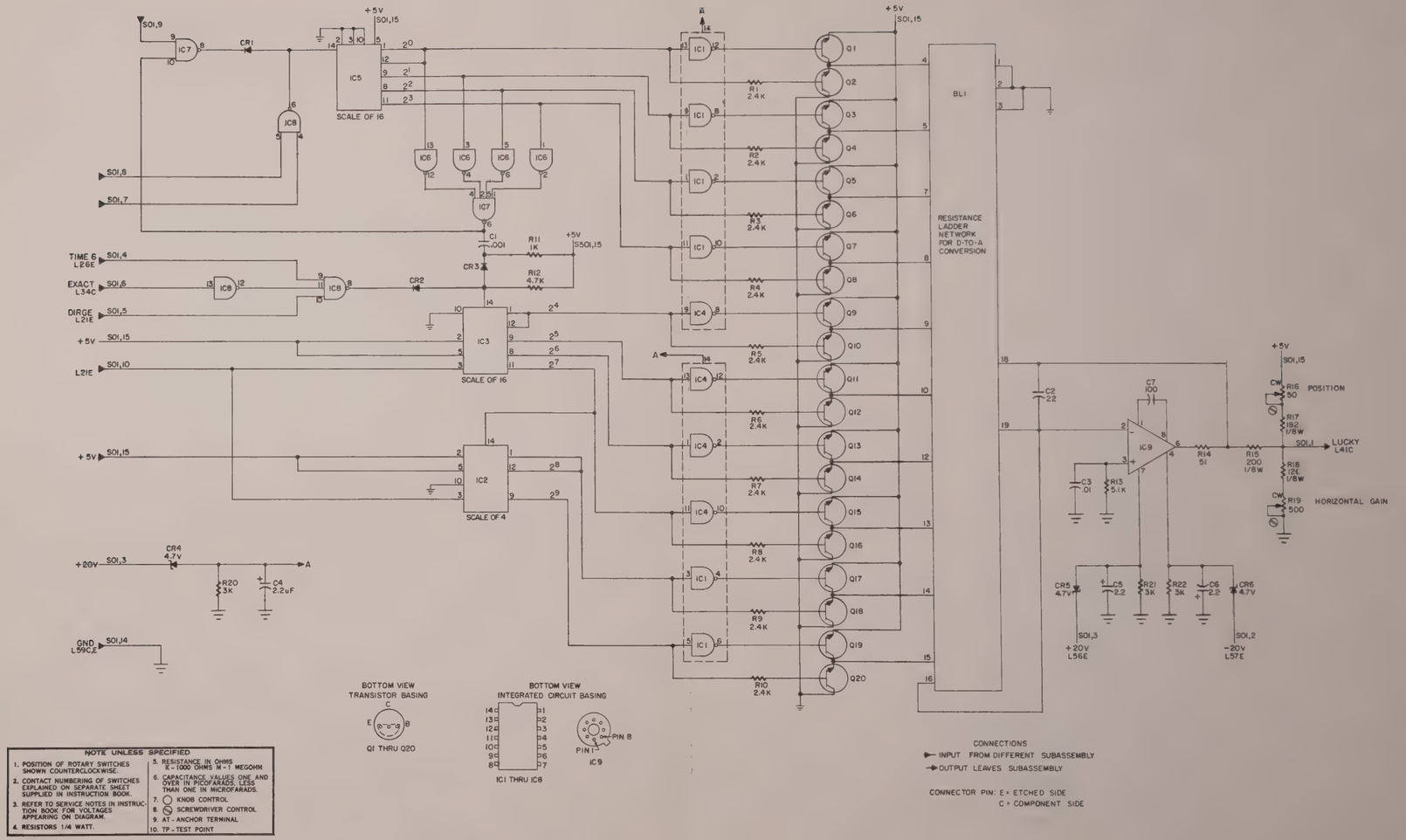


Figure 6-24. Schematic diagram of system control 2 ("piggy-back" section). See, also, Figure 6-22.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Ceramic .01 µF +80-20% 100 V	4401-3100	80131	CC61, .01 µF +80-20%	5910-974-5697
C2	Ceramic 100 pF ±10% 500 V	4404-1108	72982	831, 100 pF ±10%	
C3	Ceramic .001 µF ±10% 500 V	4405-2108	72982	801, .001 µF ±10%	5910-914-0087
C4	Mica 33 pF ±10% 500 V	4620-0653	72136	CM15, 33 pF ±10%	
C7	Ceramic 47 pF ±10% 500 V	4404-0478	72982	831, 47 pF ±10%	
C8	Ceramic 47 pF ±10% 500 V	4404-0478	72982	831, 47 pF ±10%	
C9	Mica 220 µF ±5% 500 V	4690-2700	00656	CM20E221G	5910-931-4153
C10	Ceramic 600 pF ±5% 500 V	4418-1605	72982	3841, 600 pF ±5%	
C11	Mica 220 pF ±5% 500 V	4690-2700	00656	CM20E221G	5910-931-4153
C12	Ceramic 600 pF ±5% 500 V	4418-1605	72982	3841, 600 pF ±5%	
C13	Mica 220 pF ±5% 500 V	4690-2700	00656	CM20E221G	5910-931-4153
C14	Ceramic 600 pF ±5% 500 V	4418-1605	72982	3841, 600 pF ±5%	
C15	Ceramic 47 µF ±10% 500 V	4404-0478	72982	831, 47 µF ±10%	
C16	Ceramic 47 pF ±10% 500 V	4404-0478	72982	831, 47 pF ±10%	
C17	Ceramic 330 pF ±10% 500 V	4404-1338	72982	831, 330 pF ±10%	5910-974-5702
C18	Electrolytic 4.7 µF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C20	Electrolytic 10 µF ±20% 20 V	4450-5100	56289	150D106X0020B2	5910-855-6343
C22	Ceramic .01 µF +80-20% 44	4401-3100	80131	CC61, .01 µF +80-20%	5910-974-5697
C23	Ceramic 330 µF ±10% 500 V	4404-1338	72982	831, 330 pF ±10%	5910-974-5702
C24	Ceramic 470 pF ±10% 500 V	4404-1478	72982	831, 470 pF ±10%	
C25	Ceramic 270 pF ±10% 500 V	4404-1278	72982	831, 270 pF ±10%	
C26	Ceramic 22 pF ±10% 500 V	4404-0228	72982	831, 22 pF ±10%	
C27	Ceramic 220 pF ±10%	4404-1228	72982	831, 220 pF ±10%	
DIODES					
CR1	Type 1N995	6082-1002	80368	1N995	
CR2	Type 1N995	6082-1002	80368	1N995	
CR3	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR4	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR5	Type 1N995	6082-1002	20368	1N995	
CR6	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR7	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR8	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR9	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR10	Type 1N995	6082-1002	80368	1N995	
CR11	Type 1N995	6082-1002	80368	1N995	
CR12	Type 1N995	6082-1002	80368	1N995	
CR13	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR14	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR15	Type 1N995	6082-1002	80368	1N995	
CR16	Type 1N995	6082-1002	80368	1N995	
CR17	Type 1N995	6082-1002	80368	1N995	
CR18	Type 1N995	6082-1002	80368	1N995	
CR19	Type 1N995	6082-1002	80368	1N995	
CR20	Type 1N995	6082-1002	80368	1N995	
CR21	Type 1N995	6082-1002	80368	1N995	
CR22	Type 1N995	6082-1002	80368	1N995	
CR23	Type 1N995	6082-1002	80368	1N995	
CR24	Type 1N995	6082-1002	80368	1N995	
CR27	Type 1N995	6082-1002	80368	1N995	
CR28	Type 1N995	6082-1002	80368	1N995	
CR29	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR30	Type 1N995	6082-1002	80368	1N995	
CR31	Type 1N995	6082-1002	80368	1N995	
CR32	Type 1N995	6082-1002	80368	1N995	
CR33	Type 1N995	6082-1002	80368	1N995	
INDUCTORS					
L1	Choke, molded 2.7 µH ±10%	4300-1300	99800	1537-22, 2.7 µH ±10%	
L2	Choke, molded 5.6 µH ±10%	4300-1800	99800	1537-30, 5.6 µH ±10%	
L3	Choke, air core Variable 4.5 to 8.5 µH	4290-4090	98821	1000D	
L4	Choke, molded 2.7 µH ±10%	4300-1300	99800	1537-22, 2.7 µH ±10%	
L5	Choke, molded 0.22 µH ±20%	4300-0200	99800	1537-00, .15 µH ±20%	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
INTEGRATED CIRCUITS					
IC1	Type SN7476N	5431-8176	01295	SN7476N	
IC2	Type SN7476N	5431-8176	01295	SN7476N	
IC3	Type SN7476N	5431-8176	01295	SN7476N	
IC4	Type SN7400N	5431-8100	01295	SN7400N	
IC5	Type SN7476N	5431-8176	01295	SN7476N	
IC6	Type SN74H11N	5431-8211	01295	SN74H11N	
IC7	Type 932	5431-9322	07263	DTµL-932	
IC8	Type 932	5431-9322	07263	DTµL-932	
IC9	Type SN7440N	5431-8140	01295	SN7440N	
IC10	Type 932	5431-9322	07263	DTµL-932	
IC11	Type 932	5431-9322	07263	DTµL-932	
IC12	Type SN7476N	5431-8176	01295	SN7476N	
IC13	Type 962	5431-9622	07263	DTµL-962	
IC14	Type SN74H10N	5431-8210	01295	SN74H10N	
IC15	Type 962	5431-9622	07263	DTµL-962	
IC16	Type SN7440N	5431-8140	01295	SN7440N	
IC17	Type SN7440N	5431-8140	01295	SN7440N	
IC18	Type SN7440N	5431-8140	01295	SN7440N	
IC19	Type SN7476N	5431-8176	01295	SN7476N	
IC20	Type 932	5431-9322	07263	DTµL-932	
IC21	Type 951	5431-9512	07263	DTµL-951	
IC22	Type SN7440N	5431-8140	01295	SN7440N	
IC23	Type 932	5431-9322	07263	DTµL-932	
IC24	Type SN7440N	5431-8140	01295	SN7440N	
IC25	Type 932	5431-9322	07263	DTµL-932	
IC26	Type SN7440N	5431-8140	01295	SN7440N	
IC27	Type 932	5431-9322	07263	DTµL-932	
IC28	Type SN7400N	5431-8100	01295	SN7400N	
IC29	Type 946	5431-9462	07263	DTµL-946	
IC30	Type SN7410N	5431-8110	96214	SN7410N	
IC31	Type 951	5431-9512	07263	DTµL-951	
IC32	Type 962	5431-9622	07263	DTµL-962	
IC33	Type 946	5431-9462	07263	DTµL-946	
IC34	Type 932	5431-9322	07263	DTµL-932	
IC35	Type 932	5431-9322	07263	DTµL-932	
IC36	Type SN7440N	5431-8140	01295	SN7440N	
IC37	Type 951	5431-9512	07263	DTµL-951	
IC38	Type SN7440N	5431-8140	01295	SN7440N	
RESISTORS					
R1	Comp. 330 Ω ±5% 1/4 W	6099-1335	75042	BTS, 330 Ω ±5%	5905-686-3369
R2	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R3	Comp. 33 Ω ±5% 1/4 W	6099-0335	75042	BTS, 33 Ω ±5%	
R4	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R5	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R6	Comp. 8.2 kΩ ±5% 1/4 W	6099-2825	75042	BTS, 8.2 kΩ ±5%	
R7	Comp. 22 Ω ±5% 1/4 W	6099-0225	75042	BTS, 22 Ω ±5%	5905-279-5459
R8	Comp. 220 kΩ ±5% 1/4 W	6099-4225	75042	BTS, 220 kΩ ±5%	
R9	Comp. 330 kΩ ±5% 1/4 W	6099-4335	75042	BTS, 330 kΩ ±5%	
R10	Comp. 91 kΩ ±5% 1/4 W	6099-3915	75042	BTS, 91 kΩ ±5%	5905-726-3807
R11	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R12	Comp. 750 Ω ±5% 1/4 W	6099-1755	75042	BTS, 750 Ω ±5%	
R13	Comp. 1.1 kΩ ±5% 1/4 W	6099-2115	75042	BTS, 1.1 kΩ ±5%	
R14	Comp. 1.6 kΩ ±5% 1/4 W	6099-2165	75042	BTS, 1.6 kΩ ±5%	
R15	Comp. 1.6 kΩ ±5% 1/4 W	6099-2165	75042	BTS, 1.6 kΩ ±5%	
R16	Comp. 1.1 kΩ ±5% 1/4 W	6099-2115	75042	BTS, 1.1 kΩ ±5%	
R17	Comp. 750 Ω ±5% 1/4 W	6099-1755	75042	BTS, 750 Ω ±5%	
R18	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R19	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R20	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R21	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R22	Comp. 10 Ω ±5% 1/4 W	6099-0105	75042	BTS, 10 Ω ±5%	5905-809-8596
R24	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R25	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R26	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R27	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R28	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
TRANSISTORS					
Q1	Type 2N3646	8210-1119	07263	2N3646	5961-964-5753
Q4	Type 2N3646	8210-1119	07263	2N3646	5961-964-5753

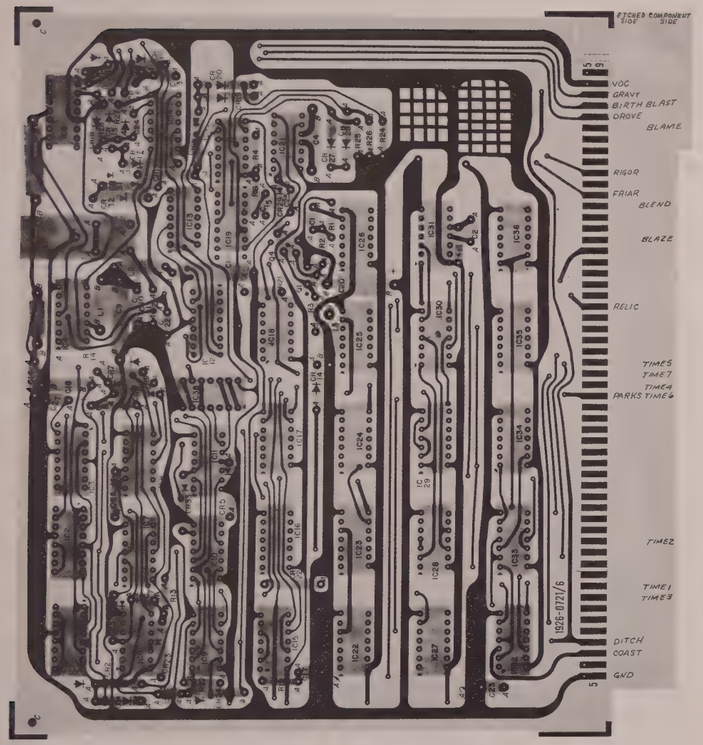


Figure 6-25. Etched-board assembly for system control 1 (board M). Complete board is P/N 1926-4721.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

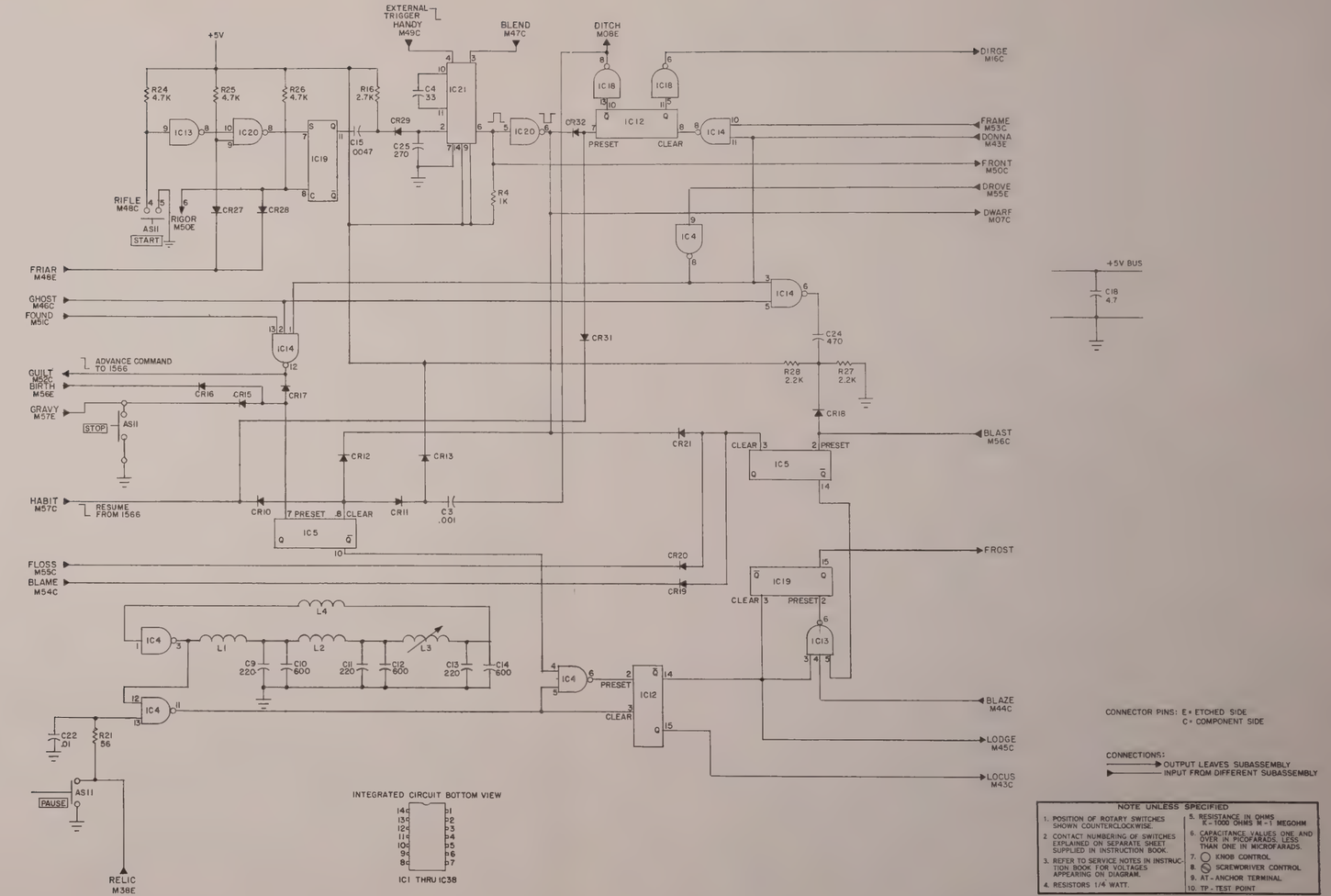
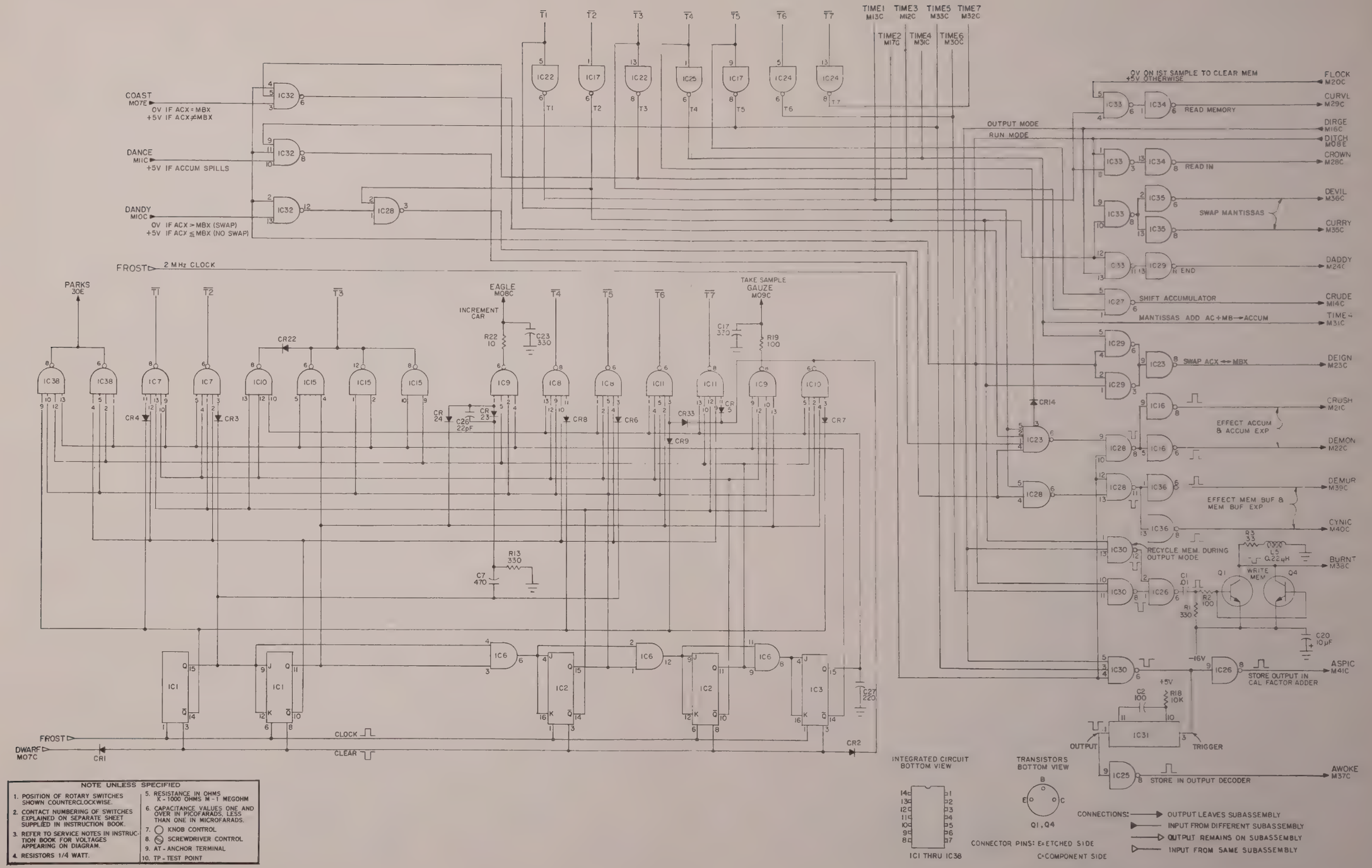


Figure 6-26. Schematic diagram of system control 1. See, also, Figure 6-27.



NOTE UNLESS SPECIFIED

1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE.
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK.
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/4 WATT.
5. RESISTANCE IN OHMS K = 1000 OHMS M = 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS.
7. ◯ KNOB CONTROL
8. ⊘ SCREWDRIVER CONTROL
9. AT = ANCHOR TERMINAL
10. TP = TEST POINT

Figure 6-27. Schematic diagram of system control 1. See, also, Figure 6-26.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C2	Ceramic 0.001 µF +80-20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C3	Ceramic 0.001 µF +80-20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C4	Ceramic 0.001 µF +80-20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C5	Ceramic 0.001 µF +80-20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C6	Ceramic 0.001 µF +80-20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C7	Ceramic 0.001 µF +80-20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C8	Ceramic 0.001 µF +80-20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C9	Electrolytic 4.7 µF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C10	Ceramic, 0.001 µF +80 -20% 500 V	4404-2109	75042	831, 0.001 µF +80-20%	5910-983-9994
C11	Ceramic, 4700 pF +80-20% 500 V	4405-2479	72982	801, 4700 pF +80-20%	
DIODES					
CR1	Type 1N995	6082-1002	80368	1N995	
CR2	Type 1N995	6082-1002	80368	1N995	
CR3,4 5,6	Type 1N995	6082-1002	80368	1N995	
INTEGRATED CIRCUITS					
IC1	Type SN74H11N	5431-8211	96214	SN74H11N	
IC2	Type SN7476N	5431-8176	96214	SN7476N	
IC3	Type SN74H11N	5431-8211	96214	SN74H11N	
IC4	Type SN7476N	5431-8176	96214	SN7476N	
IC5	Type SN74H11N	5431-8211	96214	SN74H11N	
IC6	Type SN7476N	5431-8176	96214	SN7476N	
IC7	Type 932	5431-9322	07263	DTµL-932	
IC8	(SN7476N	5431-8176	96214	SN7476N	
IC9	Type SN7401N	5431-8101	96214	SN7401N	
IC10	Type SN7476N	5431-8176	96214	SN7476N	
IC11	Type SN7401N	5431-8101	96214	SN7401N	
IC12	Type SN7476N	5431-8176	96214	SN7476N	
IC13	Type SN7401N	5431-8101	96214	SN7401N	
IC14	Type 944	5431-9442	07263	DTµL-944	
IC15	Type SN7401N	5431-8101	96214	SN7401N	
IC1	Type SN7476N	5431-8176	96214	SN7476N	
IC17	Type SN7401N	5431-8101	96214	SN7401N	
IC18	Type SN7476N	5431-8176	96214	SN7476N	
IC19	Type SN7401N	5431-8101	96214	SN7401N	
IC20	Type SN7476N	5431-8176	96214	SN7476N	
IC21	Type 944	5431-9442	07263	DTµL-944	
IC22	Type SN7476N	5431-8176	96214	SN7476N	
IC23	Type SN74H11N	5431-8211	96214	SN74H11N	
IC24	Type SN7476N	5431-8176	96214	SN7476N	
IC25	Type SN74H11N	5431-8211	96214	SN74H11N	
IC26	Type SN7476N	5431-8176	96214	SN7476N	
IC27	Type SN74H11N	5431-8211	96214	SN74H11N	
IC28	Type SN74H11N	5431-8211	96214	SN74H11N	
IC29	Type 933	5431-9332	07263	DTµL-933	
IC30	Type SN74H30N	5431-8230	96214	SN7430N	
IC31	Type 933	5431-9332	07263	DTµL-933	
IC32	Type 933	5431-9332	07263	DTµL-933	
IC33	Type 933	5431-9332	07263	DTµL-933	
IC34	Type 930	5431-9302	07263	NTµL-930	
IC35	Type 930	5431-9302	07263	NTµL-930	
IC36	Type SN74H11N	5431-8211	96214	SN74H11N	
IC37	Type 946	5431-9462	07263	DTµL-946	
IC38	Type 936	5431-9362	07263	DTµL-936	
IC39	Type 946	5431-9462	07263	DTµL-946	
IC40	Type 936	5431-9362	07263	DTµL-936	
L1	Choke, molded	4300-7005	99800	2500-32, 1200 µH ±5%	
RESISTORS					
R1	Comp. 1 kΩ ±10% 1/4 W	6099-2109	75042	BTS, 1 kΩ ±10%	
R4	Comp., 470 Ω ±10% 1/4 W	6099-1475	75042	BTS, 470 Ω ±10%	5905-683-2242
R5	Comp. 3.3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3.3 kΩ ±10%	
R6	Comp. 3.3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3.3 kΩ ±10%	
R8	Comp., 4.7 kΩ ±10% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±10%	5905-686-9992
R9	Comp., 4.7 kΩ ±10% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±10%	5905-686-9992
R10	Comp., 4.7 kΩ ±10% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±10%	5905-686-9992
R11	Comp., 4.7 kΩ ±10% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±10%	5905-686-9992
R12	Comp., 4.7 kΩ ±10% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±10%	5905-686-9992
R13	Comp., 4.7 kΩ ±10% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±10%	5905-686-9992
R14	Comp., 4.7 kΩ ±10% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±10%	5905-686-9992
R15	Comp. 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ ±5%	5905-279-4629
R16	Comp. 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ ±5%	5905-279-4629
R17	Comp., 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9992

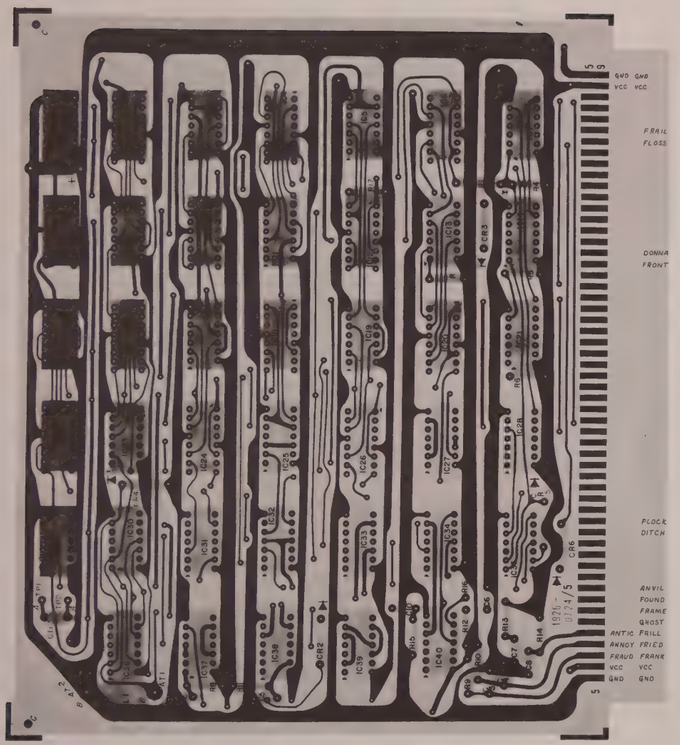


Figure 6-28. Etched-board assembly for modulated oscillator and counter (board N). Complete board is P/N 1926-4724.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

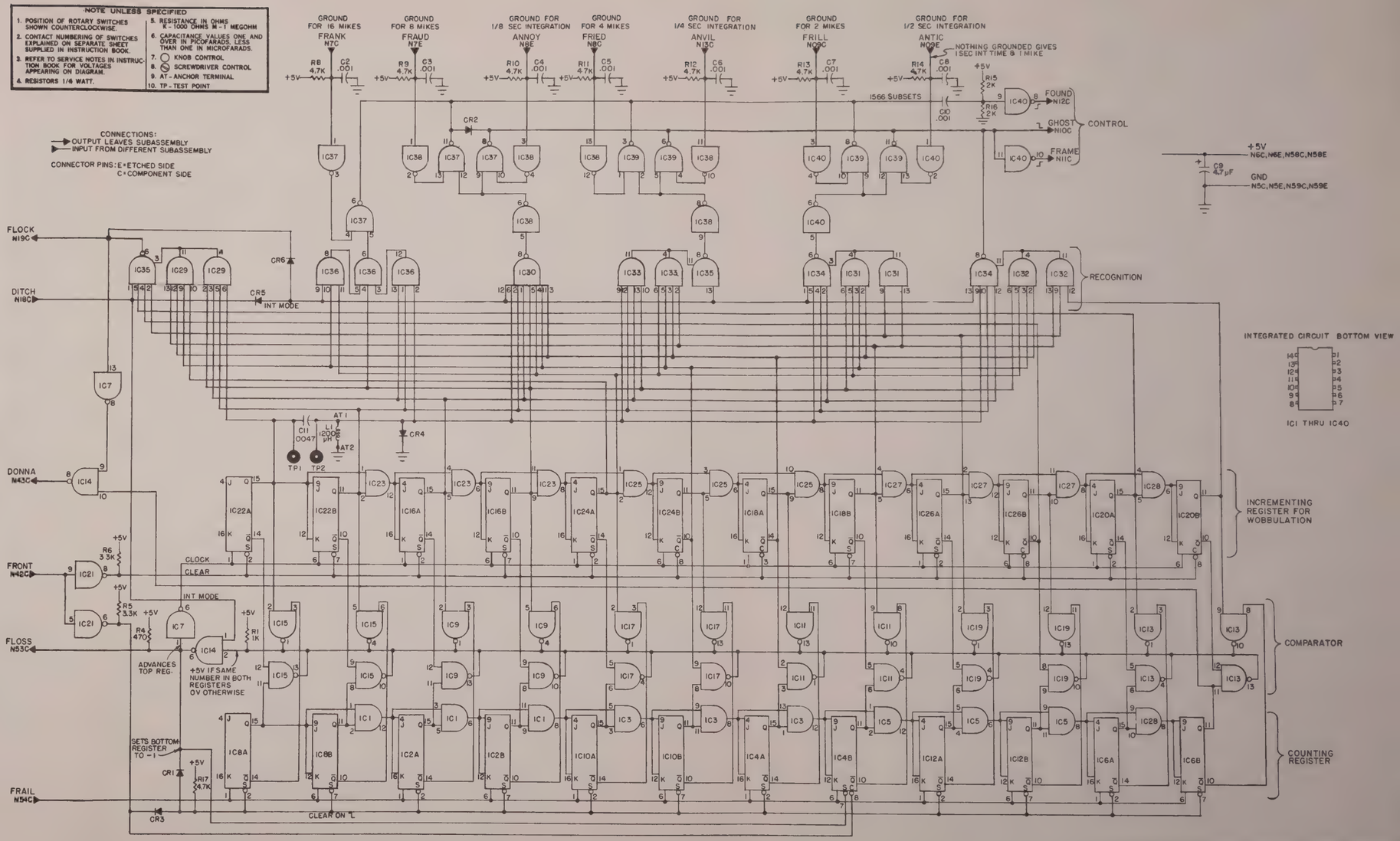


Figure 6-29. Schematic diagram of modulated oscillator and counter.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Ceramic, 0.01 μF +80-20%	4401-3100	80131	CC61, 0.01 μF +80-20%	5910-974-5697
C2	Electrolytic 4.7 μF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C3	Ceramic .001 μF +80-20% 500 V	4404-2109	72982	831, .001 μF +80-20%	5910-983-9994
C4	Ceramic 330 pF ±10% 500 V	4404-1338	72982	831, 330 pF ±10%	5910-974-5702
C5	Ceramic 470 pF ±10% 500 V	4404-1478	72982	831, 470 pF ±10%	
C6	Ceramic 220 pF ±10% 500 V	4404-1228	72982	831, 220 pF ±10%	
DIODES					
CR1	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR2	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR3	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR4	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR5	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR6	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR7	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR8	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR9	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR10	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR11	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR12	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR13	Type 1N995	6082-1002	80368	1N995	
CR14	Type 1N995	6082-1002	80368	1N995	
CR15	Type 1N995	6082-1002	80368	1N995	
CR16	Type 1N995	6082-1002	80368	1N995	
CR17	Type 1N995	6082-1002	80368	1N995	
CR18	Type 1N995	6082-1002	80368	1N995	
INTEGRATED CIRCUITS					
IC1	Type 930	5431-9302	07263	NTμL-930	
IC2	Type 930	5431-9302	07263	NTμL-930	
IC3	Type 930	5431-9302	07263	NTμL-930	
IC4	Type 930	5431-9302	07263	NTμL-930	
IC5	Type 930	5431-9302	07263	NTμL-930	
IC6	Type 930	5431-9302	07263	NTμL-930	
IC7	Type 930	5431-9302	07263	NTμL-930	
IC8	Type 930	5431-9302	07263	NTμL-930	
IC9	Type 930	5431-9302	07263	NTμL-930	
IC10	Type 930	5431-9302	07263	NTμL-930	
IC11	Type 930	5431-9302	07263	NTμL-930	
IC12	Type 930	5431-9302	07263	NTμL-930	
IC13	Type 930	5431-9302	07263	NTμL-930	
IC14	Type 930	5431-9302	07263	NTμL-930	
IC15	Type 930	5431-9302	07263	NTμL-930	
IC16	Type 962	5431-9622	07263	DTμL-962	
IC17	Type 962	5431-9622	07263	DTμL-962	
IC18	Type 946	5431-9462	07263	DTμL-946	
IC19	Type 936	5431-9362	07263	DTμL-936	
IC20	Type 932	5431-9322	07263	DTμL-932	
IC21	Type 932	5431-9322	07263	DTμL-932	
IC22	Type 932	5431-9322	07263	DTμL-932	
IC23	Type 932	5431-9322	07263	DTμL-932	
IC24	Type 932	5431-9322	07263	DTμL-932	
IC25	Type SN7482N	5431-8182	96214	SN7482N	
IC26	Type SN7483N	5431-8183	96214	SN7483N	
IC27	Type SN7430N	5431-8130	96214	SN7483N	
IC28	Type SN74H11N	5431-8211	96214	SN74H11N	
IC29	Type SN74H11N	5431-8211	96214	SN74H11N	
IC30	Type SN7476N	5431-8176	96214	SN7476N	
IC31	Type SN7476N	5431-8176	96214	SN7476N	
IC32	Type SN7476N	5431-8176	96214	SN7476N	
IC33	Type SN7430N	5431-8130	96214	SN7430N	
IC34	Type 930	5431-9302	07263	NTμL-930	
IC35	Type SN74H40N	5431-8240	96214	SN7440N	
IC36	Type SN74H11N	5431-8211	96214	SN74H11N	
IC37	Type 930	5431-9302	07263	NTμL-930	
IC38	Type 930	5431-9302	07263	NTμL-930	
IC39	Type SN74H11N	5431-8211	96214	SN74H11N	
IC40	Type SN74H11N	5431-8211	96214	SN74H11N	
IC41	Type 936	5431-9362	07263	DTμL-936	
IC42	Type SN7430N	5431-8130	96214	SN7430N	
RESISTORS					
R2	Comp., 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R3	Comp. 3.3 kΩ ±10% 1/4 W	6099-2339	75042	BTS, 3.3 kΩ ±10%	
R4	Comp. 4.7 kΩ ±10% 1/4 W	6099-2479	75042	BTS, 4.7 kΩ ±10%	
R5	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R6	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	
R7	Comp. 100 Ω ±5% 1/4 W	6099-1105	75042	BTS, 100 Ω ±5%	

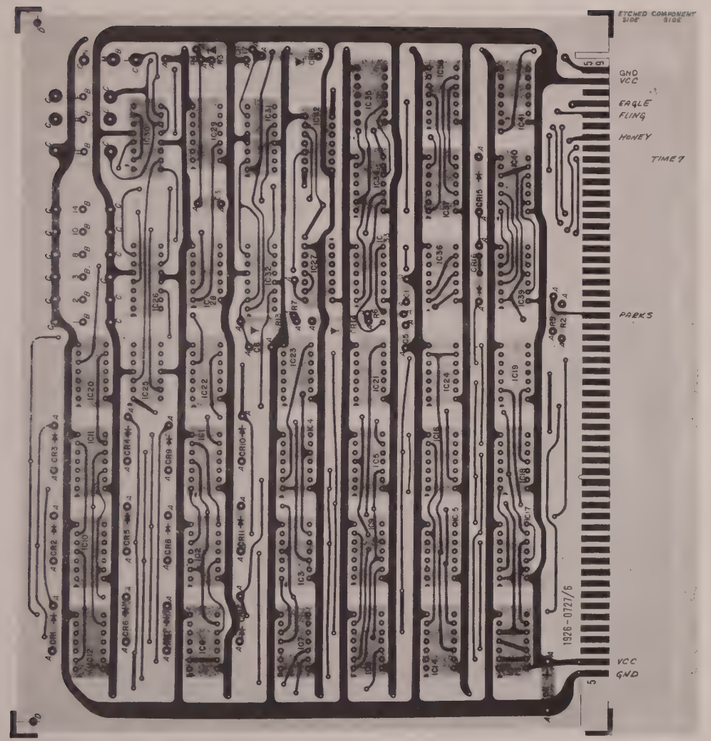


Figure 6-30. Etched-board assembly for channel identification (board P). Complete board is P/N 1926-4727.

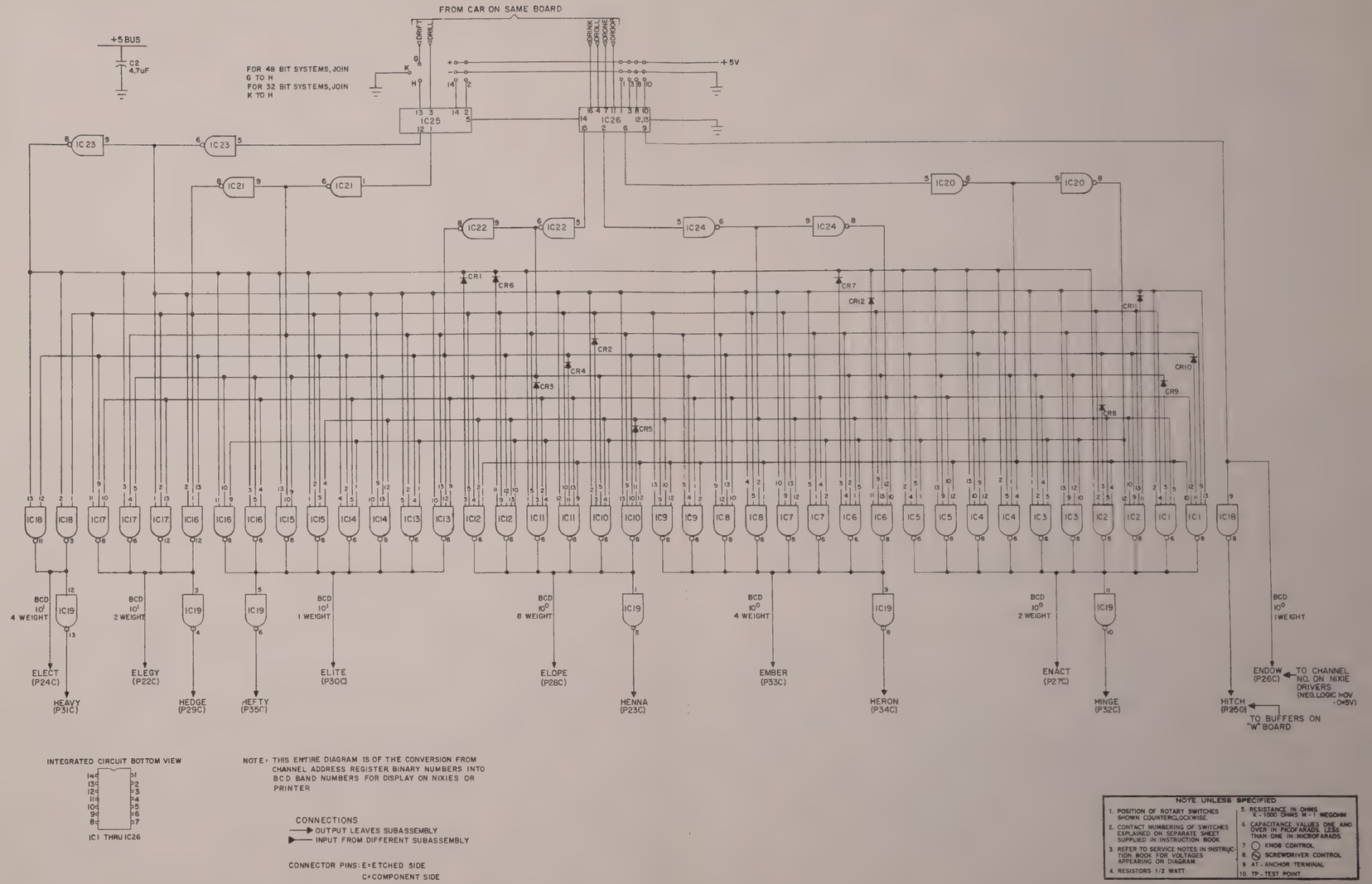


Figure 6-31. Schematic diagram of channel identification. See, also, Figure 6-32.

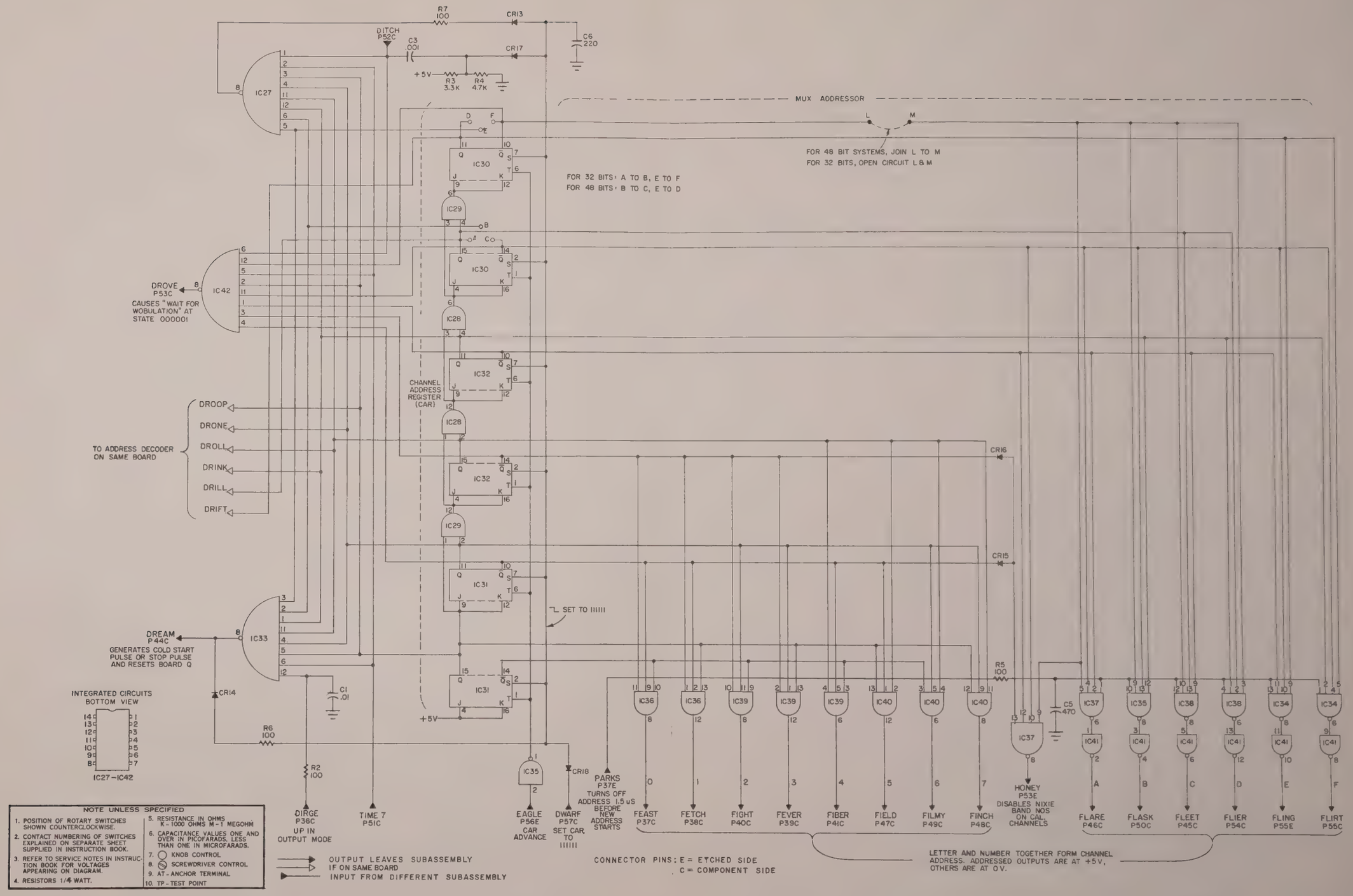


Figure 6-32. Schematic diagram of channel identification. See, also, Figure 6-31.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C2	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C3	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C4	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C5	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C6	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C7	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C8	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C9	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C10	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C11	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C12f	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C13	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C14	Ceramic .001 µF +80-20% 500 V	4404-2109	72982	831, .001 µF +80-20%	5910-983-9994
C15	Electrolytic 4.7 µF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C16	Ceramic, 470 pF ±10%	4404-1478	72989	831, 470 pF ±10%	
C17	Ceramic, 220 pF ±10%	4404-1228	72989	831, 220 pF ±10%	
C18	Ceramic, 470 pF ±10%	4404-1478	72989	831, 470 pF ±10%	
DIODES					
CR1	Type 1N995	6082-1002	80368	1N995	
CR2	Type 1N995	6082-1002	80368	1N995	
CR3	Type 1N995	6082-1002	80368	1N995	
INTEGRATED CIRCUITS					
IC1	Type 936	5431-9362	07263	DTµL-936	
IC2	Type 962	5431-9622	07263	DTµL-962	
IC3	Type 946	5431-9462	07263	DTµL-946	
IC4	Type 962	5431-9622	07263	DTµL-962	
IC5	Type 946	5431-9462	07263	DTµL-946	
IC6	Type 936	5431-9362	07263	DTµL-936	
IC7	Type 962	5431-9622	07263	DTµL-962	
IC8	Type SN7401N	5431-8101	96214	SN7401N	
IC9	Type SN7401N	5431-8101	96214	SN7401N	
IC10	Type 936	5431-9362	07263	DTµL-936	
IC11	Type SN7401N	5431-8101	96214	SN7401N	
IC12	Type SN7401N	5431-8101	96214	SN7401N	
IC13	Type 936	5431-9362	07263	DTµL-936	
IC14	Type SN7472N	5431-8172	96214	SN7472N	
IC15	Type SN7401N	5431-8101	96214	SN7401N	
IC16	Type SN7401N	5431-8101	96214	SN7401N	
IC17	Type 936	5431-9362	07263	DTµL-936	
IC18	Type SN7401N	5431-8101	96214	SN7401N	
RESISTORS					
R1	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R2	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R3	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R4	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R5	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R6	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R7	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R8	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R9	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R10	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R11	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R12	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R13	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R14	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R15	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R16	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969

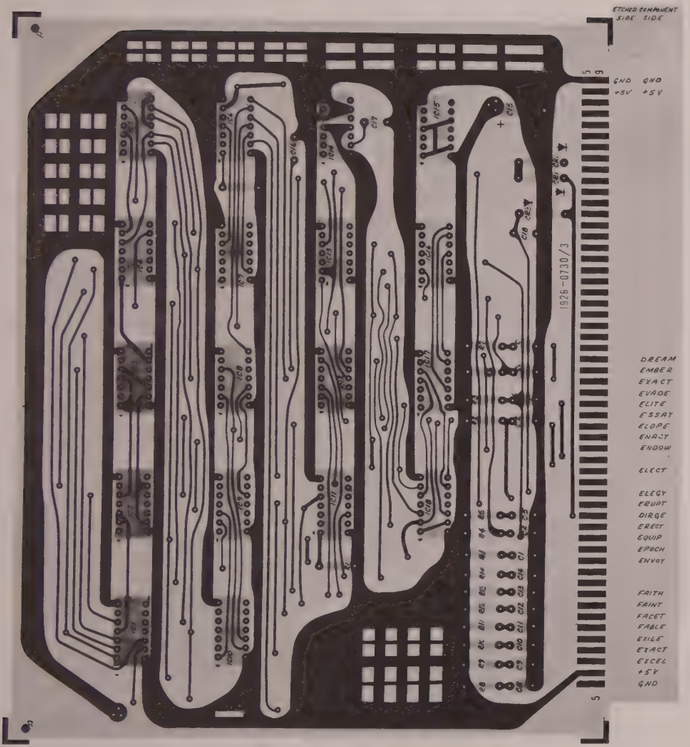


Figure 6-33. Etched-board assembly for channel display (board Q). Complete board is P/N 1926-4730.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

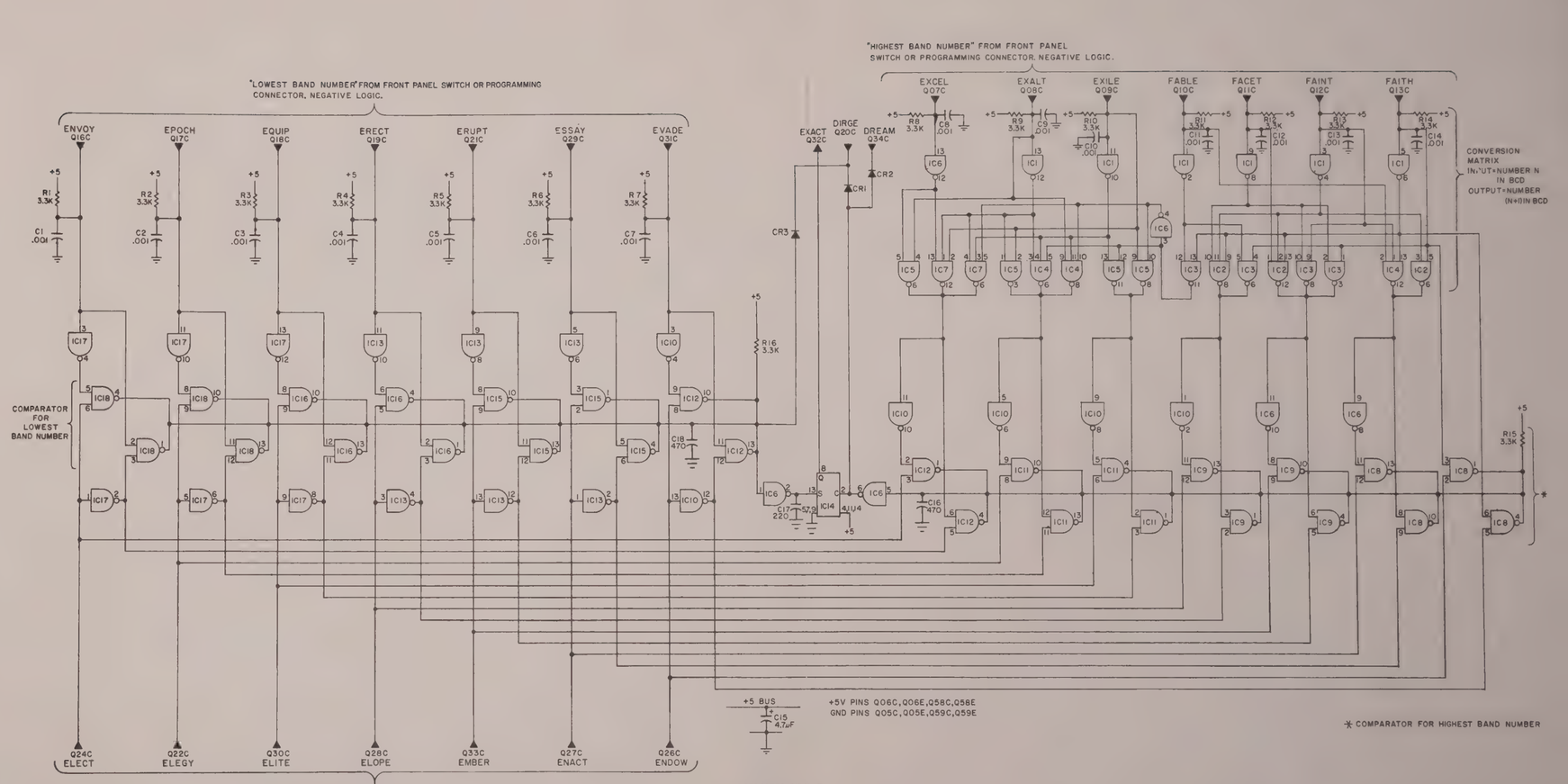


Figure 6-34. Schematic diagram of channel display.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CIRCUIT BREAKER					
CR1		1926-2000	24655	1926-2000	
CONNECTORS					
J1	Multiple Socket	4230-5050	02660	57-20500	
J2	Multiple Socket	5230-5050	02660		
RESISTORS					
R1	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R2	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R3	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R4	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R5	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R6	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R7	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R8	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R9	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R10	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R11	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R12	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R13	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897
R14	Comp. 56 Ω ±5% 1/2 W	6100-0565	01121	RC20GF560J	5905-279-1897

Parts List for Mother Board R (P/N 1926-4751).

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Electrolytic 4.7 μF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
DIODES					
CR1	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR2	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR3	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR4	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR5	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR6	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
INTEGRATED CIRCUITS					
IC1	Type 962	5431-9622	07263	DTμL-962	
IC2	Type 930	5431-9302	07263	NTμL-930	
IC3	Type SN7440N	5431-8140	01295	SN7440N	
IC4	Type SN7440N	5431-8140	01295	SN7440N	
IC5	Type SN7400N	5431-8100	01295	SN7400N	
IC6	Type SN7400N	5431-8100	01295	SN7400N	
IC7	Type 962	5431-9622	07263	DTμL-962	
IC8	Type 961	5431-9612	07263	DTμL-961	
IC9	Type SN7440N	5431-8140	01295	SN7440N	
IC10	Type SN7440N	5431-8140	01295	SN7440N	
IC11	Type SN7400N	5431-8100	01295	SN7400N	
IC12	Type SN7400N	5431-8100	01295	SN7400N	
IC13	Type 930	5431-9302	07263	NTμL-930	
IC14	Type 930	5431-9302	07263	NTμL-930	
IC15	Type 961	5431-9612	07263	DTμL-961	
IC16	Type 961	5431-9612	07263	DTμL-961	
IC17	Type SN7440N	5431-8140	01295	SN7440N	
IC18	Type SN7400N	5431-8100	01295	SN7400N	
IC19	Type 930	5431-9302	07263	NTμL-930	
IC20	Type 930	5431-9302	07263	NTμL-930	
IC21	Type 963	5431-9632	07263	DTμL-963	
IC22	Type 963	5431-9632	07263	DTμL-963	
IC23	Type 9016	5431-9608	07263	TTμL-9016	
IC24	Type 961	5431-9612	07263	DTμL-961	
IC25	Type 930	5431-9302	07263	NTμL-930	
IC26	Type 930	5431-9302	07263	NTμL-930	
IC27	Type 963	5431-9632	07263	DTμL-963	
IC28	Type 963	5431-9632	07263	DTμL-963	
IC29	Type 963	5431-9632	07263	DTμL-963	
IC30	Type 961	5431-9612	07263	DTμL-963	
IC31	Type 930	5431-9302	07263	NTμL-930	
IC32	Type 930	5431-9302	07263	NTμL-930	
IC33	Type 949	5431-9492	07263	DTμL-949	
IC34	Type 949	5431-9492	07263	DTμL-949	
IC35	Type 963	5431-9632	07263	DTμL-963	
IC36	Type 963	5431-9632	07263	DTμL-963	
IC37	Type 963	5431-9632	07263	DTμL-963	
IC38	Type 930	5431-9302	07263	NTμL-930	
IC39	Type 949	5431-9492	07263	DTμL-949	
IC40	Type 9016	5431-9608	07263	TTμL-9016	
IC41	Type SN7483N	5431-8183	96214	SN7483N	
IC42	Type 9016	5431-9608	07263	TTμL-9016	
IC43	Type 9016	5431-9608	07263	TTμL-9016	
IC44	Type 949	5431-9492	07263	DTμL-949	
IC45	Type 9016	5431-9608	07263	TTμL-9016	
IC46	Type SN7482N	5431-8182	96214	SN7482N	

Parts List for Log Converter, board S (P/N 1926-4703).

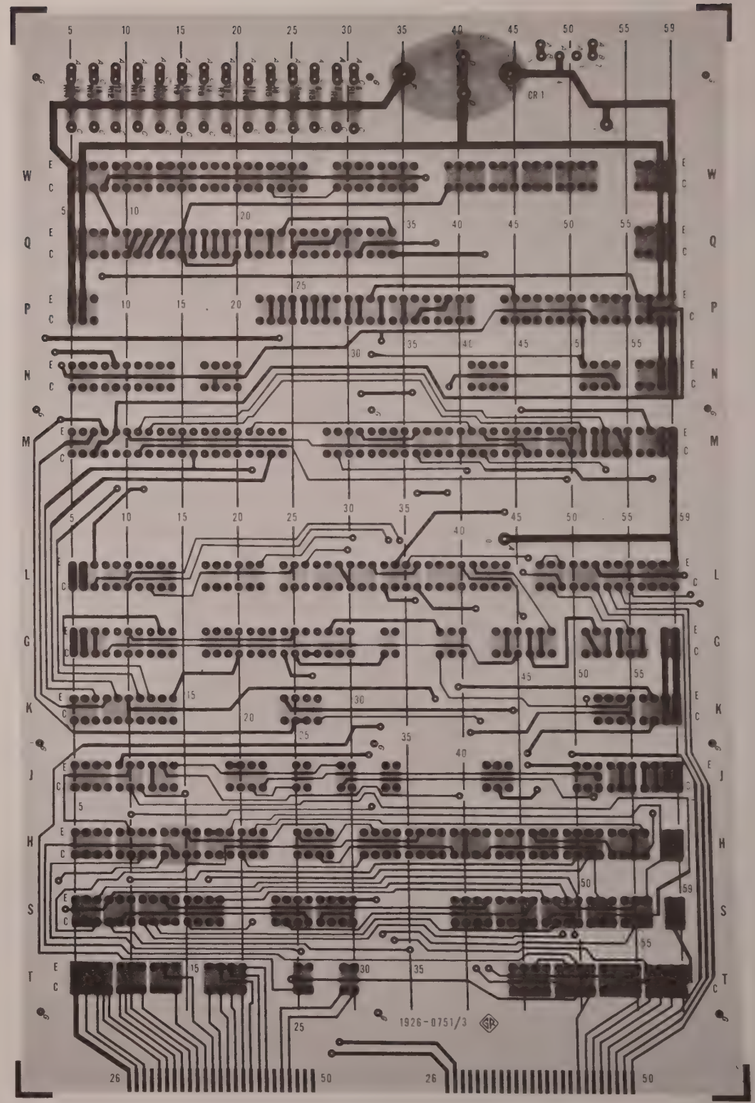


Figure 6-35. Etched-board assembly for large mother board (R). Complete board is P/N 1926-4751.

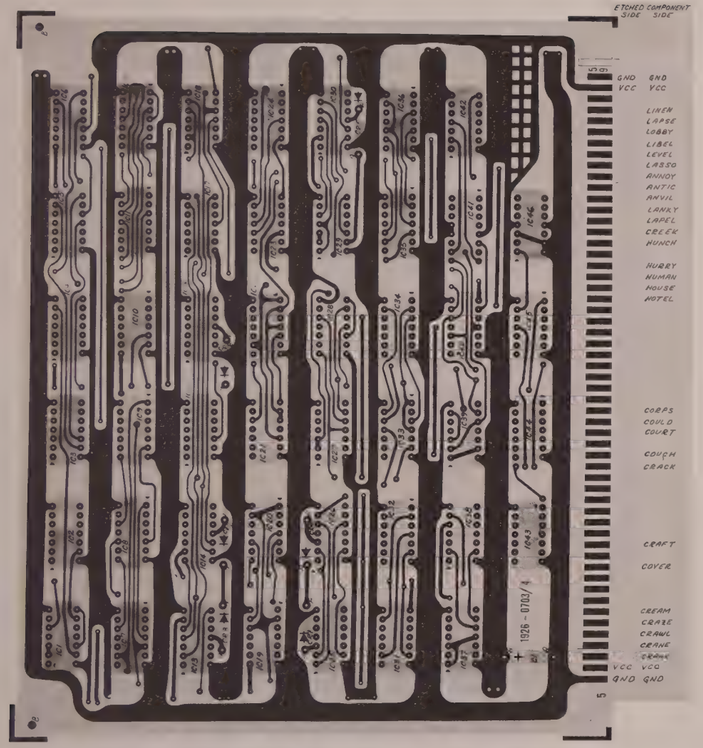


Figure 6-36. Etched-board assembly for log converter (board S). Complete board is P/N 1926-4703.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

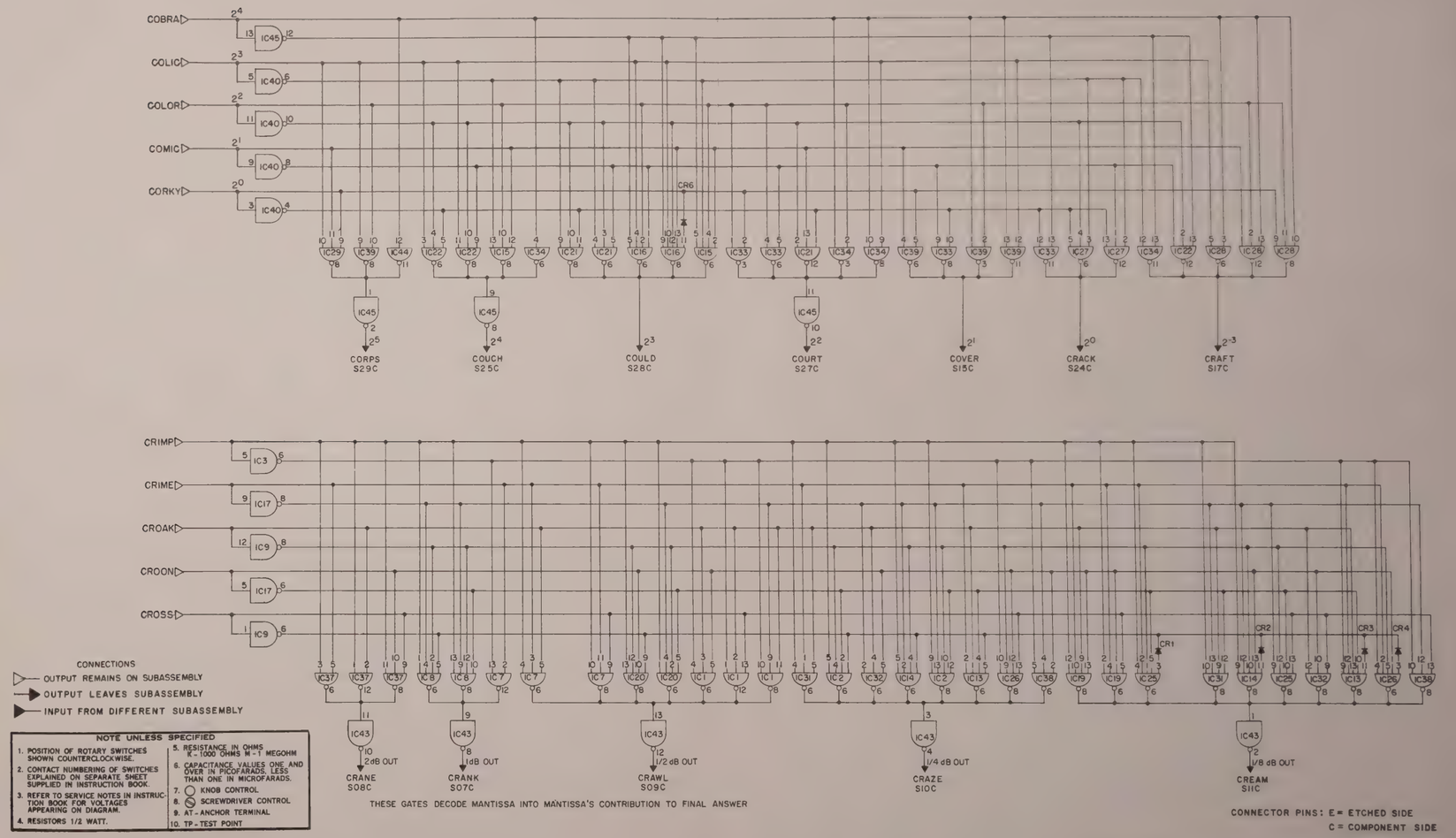
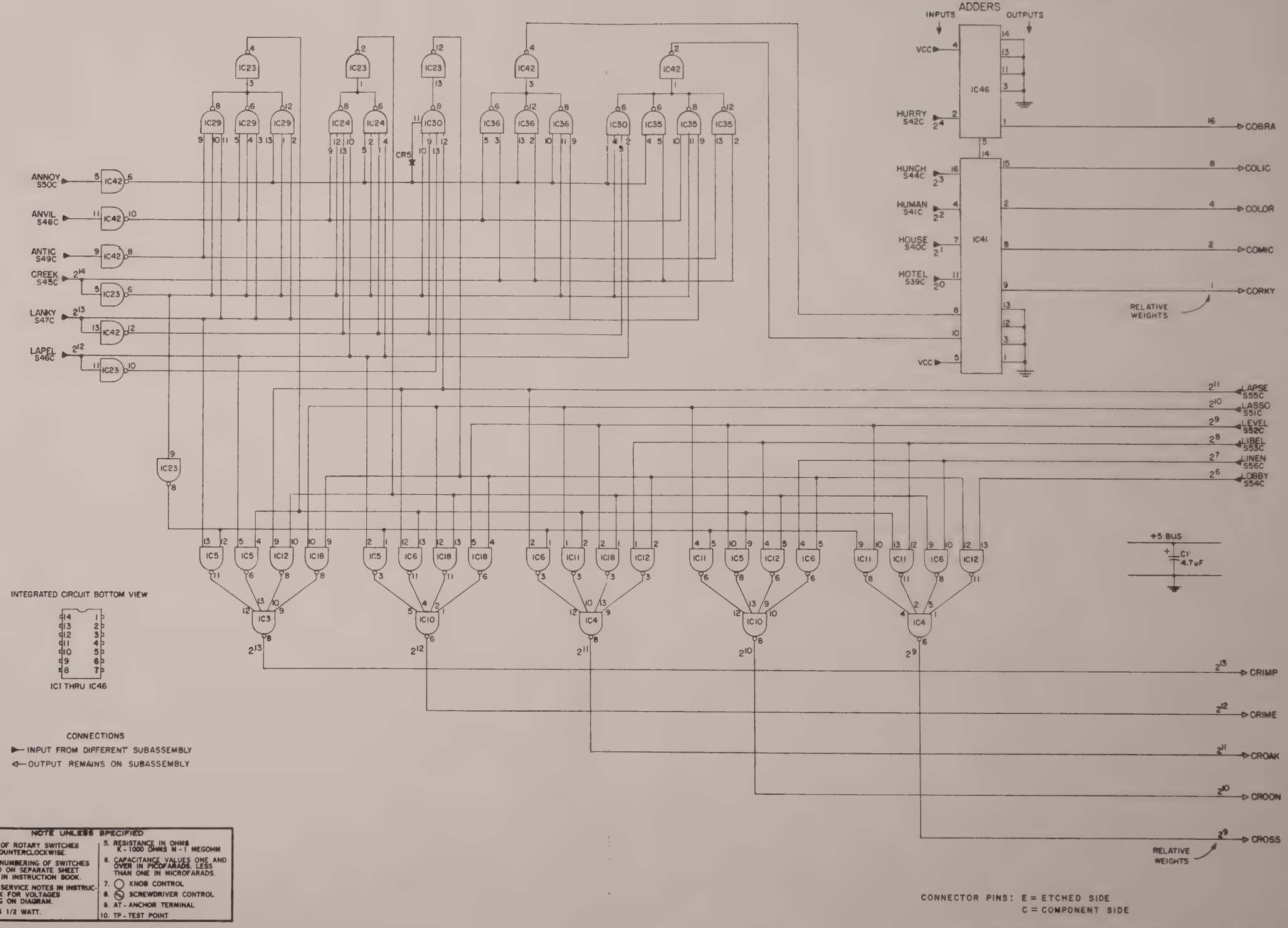


Figure 6-37. Schematic diagram of log converter. See, also, Figure 6-38.



NOTE UNLESS SPECIFIED

1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE.
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK.
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/2 WATT.
5. RESISTANCE IN OHMS K - 1000 OHMS M - 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS.
7. KNOB CONTROL
8. SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT

Figure 6-38. Schematic diagram of log converter. See, also, Figure 6-37.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
C1	Electrolytic, 4.7 µF ±20% 50 V	4450-4990	56289	150D475X0050B2	
C2	Electrolytic, 100 µF +150 -10% 15 V	4450-2800	56289	D17872	5910-034-5368
C3	Ceramic, .47 µF ±20% 25 V	4400-2054	80183	5C13, 0.47 µF ±20%	5910-974-5696
C4	Ceramic, .47 µF ±20% 25 V	4400-2054	80183	5C13, 0.47 µF ±20%	5910-974-5696
C5	Electrolytic, 100 µF +150 -10% 15 V	4450-2800	56289	D17872	5910-034-5368
C6	Electrolytic, 100 µF +150 -10% 15 V	4450-2800	56289	D17872	5910-034-5368
C7	Ceramic, .47 µF ±20% 25 V	4400-2054	80183	5C13, 0.47 µF ±20%	5910-974-5696
Integrated Circuits					
CR1	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR2	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
1C1	Type 962	5431-9622	07263	DTµL-962	
1C2	Type 962	5431-9622	07263	DTµL-962	
1C3	Type 936	5431-9362	07263	DTµL-936	
1C4	Type 946	5431-9462	07263	DTµL-946	
1C5	Type 936	5431-9362	07263	DTµL-936	
1C6	Type SN7483N	5431-8183	96214	SN7483N	
1C7	Type SN7483N	5431-8183	96214	SN7483N	
1C8	Type SN7483N	5431-8183	96214	SN7483N	
1C9	Type SN7483N	5431-8183	96214	SN7483N	
1C10	Type SN7475N	5431-8175	96214	SN7475N	
1C11	Type SN7475N	5431-8175	96214	SN7475N	
1C12	Type 936	5431-9362	07263	DTµL-936	
1C13	Type 946	5431-9462	07263	DTµL-946	
1C14	Type SN7475N	5431-8175	96214	SN7475N	
1C15	Type SN7475N	5431-8175	96214	SN7475N	
1C16	Type SN7475N	5431-8175	96214	SN7475N	
1C17	Type 962	5431-9622	07263	DTµL-962	
1C18	Type 962	5431-9622	07263	DTµL-962	
1C19	Type 930	5431-9302	07263	NTµL-930	
1C20	Type 930	5431-9302	07263	NTµL-930	
1C21	Type 962	5431-9622	07263	DTµL-962	
1C22	Type 930	5431-9302	07263	NTµL-930	
1C23	Type 930	5431-9302	07263	NTµL-930	
1C24	Type 946	5431-9462	07263	DTµL-946	
1C25	Type 962	5431-9622	07263	DTµL-962	
1C26	Type 936	5431-9362	07263	DTµL-936	
1C27	Type SN7483N	5431-8183	96214	SN7483N	
IC28	Type SN7483N	5431-8183	96214	SN7483N	
IC29	Type SN7483N	5431-8183	96214	SN7483N	
IC30	Type SN7483N	5431-8183	96214	SN7483N	
IC31	Type 930	5431-9302	07263	NTµL-930	
IC32	Type SN7400N	5431-8100	01295	SN7400N	
IC34	Type 946	5431-9462	07263	DTµL-946	
IC37	Type SN7400N	5431-8100	01295	SN7400N	
R1	Composition 220Ω ±5% 1/4 W	6099-1225	75042	BTS, 220Ω 5%	5905-683-2240
R2	Composition 220Ω ±5% 1/4 W	6099-1225	75042	BTS, 220Ω 5%	5905-683-2240
R3	Composition 220Ω ±5% 1/4 W	6099-1225	75042	BTS, 220Ω 5%	5905-683-2240
R4	Composition 220Ω ±5% 1/4 W	6099-1225	75042	BTS, 220Ω 5%	5905-683-2240
R5	Composition 220Ω ±5% 1/4 W	6099-1225	75042	BTS, 220Ω 5%	5905-683-2240
R6	Composition 220Ω ±5% 1/4 W	6099-1225	75042	BTS, 220Ω 5%	5905-683-2240

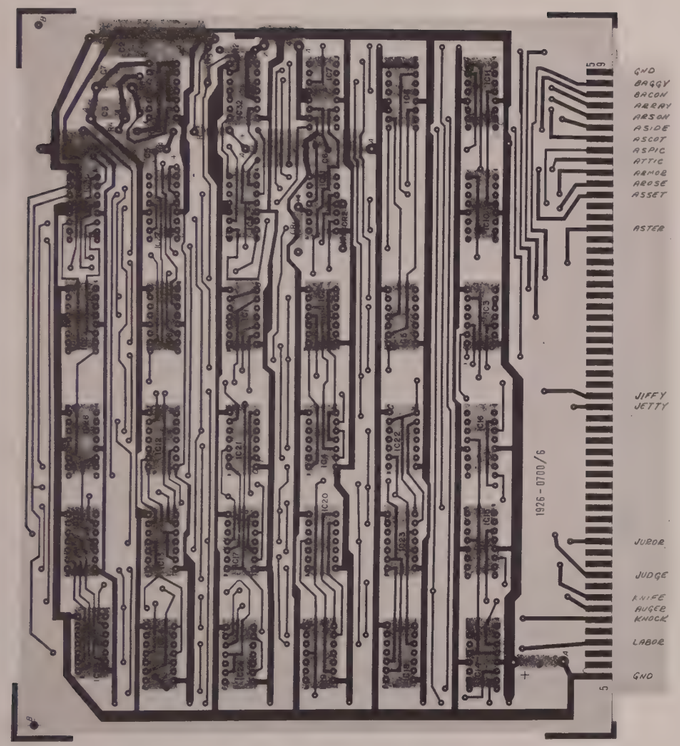


Figure 6-39. Etched-board assembly for output decoder (board T). Complete board is P/N 1926-4700.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

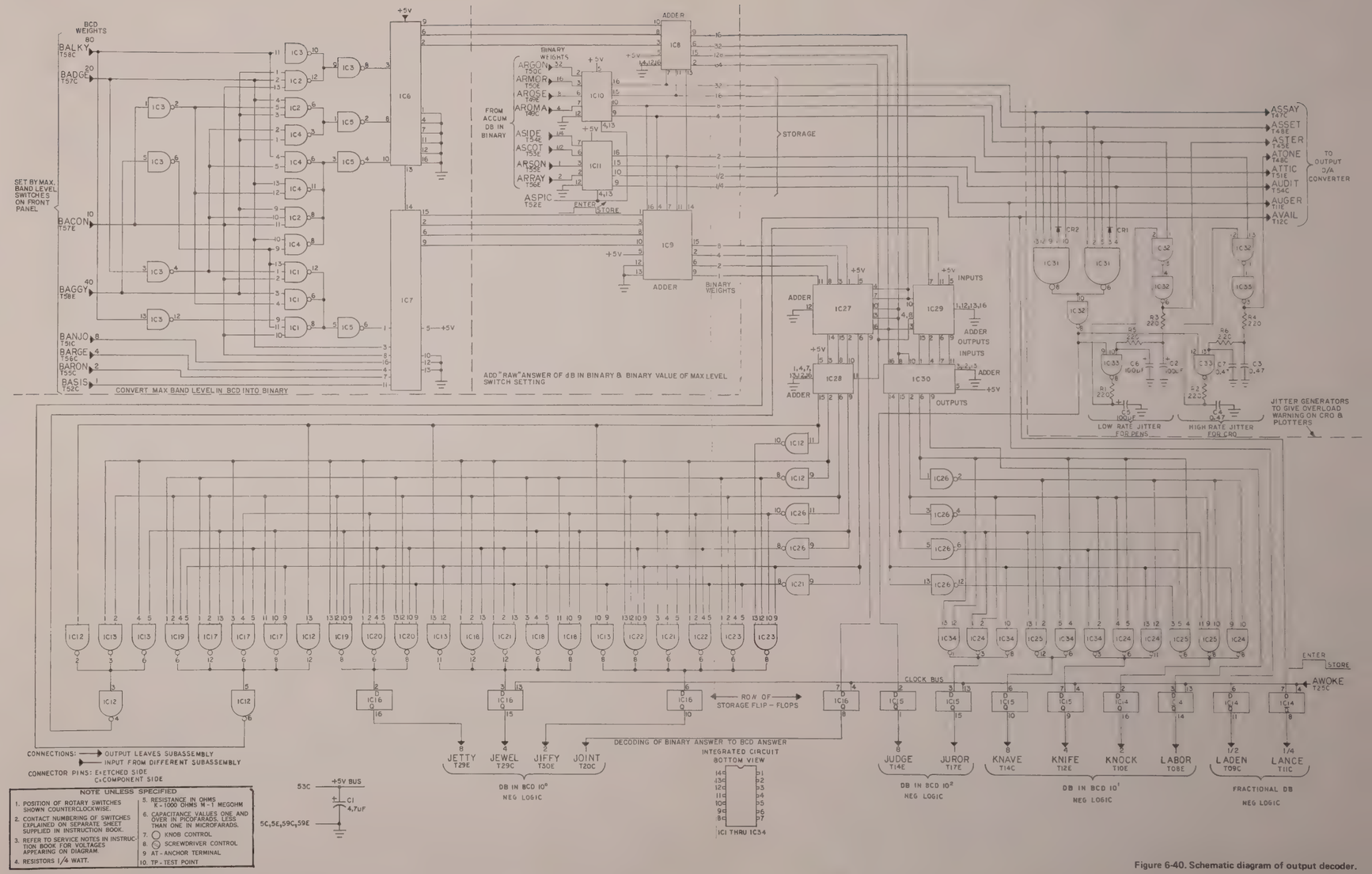


Figure 6-40. Schematic diagram of output decoder.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
C2	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
C3	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
C4	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
C5	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
C6	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
C7	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
C8	Ceramic .01µF +80-20% 500 V	4401-3100	80131	CC61, .01µF +80-20%	5910-974-5697
DIODES					
CR1	Type 1N645	6083-1016	28959	1N967B	
CR2	Type 1N645	6083-1016	28959	1N967B	
CR3	Type 1N976B	6083-1020	86800	1N976B	
CR4	Type 1N976B	6083-1020	86800	1N976B	
CR5	Type 1N3254	6081-1002	09213	1N3254	5961-082-3988
INTEGRATED CIRCUITS					
IC1	Type 936	5431-9362	07263	DTµL-936	
IC2	Type 946	5431-9462	07263	DTµL-946	
IC3	Type 960	5431-9602	07263	CTµL-960	
IC4	Type 960	5431-9602	07263	CTµL-960	
IC5	Type 960	5431-9602	07263	CTµL-960	
IC6	Type 960	5431-9602	07263	CTµL-960	
IC7	Type 960	5431-9602	07263	CTµL-960	
IC8	Type 960	5431-9602	07263	CTµL-960	
IC9	Type 960	5431-9602	07263	CTµL-960	
NIXIE SOCKET					
NIXIE SOCKET (7 REQD)		7540-3466	83781	RTS-14	
RESISTORS					
R1	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R2	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R3	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R4	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R5	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R6	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R7	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R8	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R9	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R10	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R11	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R12	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R13	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R14	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R15	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R16	Comp. 56 Ω ±5% 1/4 W	6099-0565	75042	BTS, 56 Ω ±5%	
R17	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R18	Comp. 33 kΩ ±5% 1 W	6110-3335	01121	RC32GF333J	5905-102-2740
R19	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R20	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R21	Comp. 33 kΩ ±5% 1 W	6110-3335	01121	RC32GF333J	5905-102-2740
R22	Comp. 33 kΩ ±5% 1 W	6110-3335	01121	RC32GF333J	5905-102-2740
R23	Comp. 33 kΩ ±5% 1 W	6110-3335	01121	RC32GF333J	5905-102-2740
R24	Comp. 33 kΩ ±5% 1 W	6110-3335	01121	RC32GF333J	5905-102-2740
R25	Comp. 33 kΩ ±5% 1 W	6110-3335	01121	RC32GF333J	5905-102-2740
R26	Comp. 33 kΩ ±5% 1 W	6110-3335	01121	RC32GF333J	5905-102-2740
R27	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R28	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R29	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R30	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R31	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R32	Comp. 2.2 kΩ ±5% 1/4 W	6099-2225	75042	BTS, 2.2 kΩ ±5%	5905-723-5251
R33	Comp. 2.7 kΩ ±5% 1/4 W	6099-2275	75042	BTS, 2.7 kΩ ±5%	
R34	Comp. 270 kΩ ±5% 1/4 W	6099-4275	75042	BTS, 270 kΩ ±5%	
R35	Comp. 470 Ω ±5% 1/4 W	6099-1475	75042	BTS, 470 Ω ±5%	5905-683-2242
R36	Comp. 22 kΩ ±5% 2 W	6120-3225	01121	RC42GF223J	5905-279-2527
R37	Comp. 15 kΩ ±5% 2 W	6120-3155	01121	RC42GF153J	5905-171-1976
R38	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
TRANSISTORS					
Q1	Type 2N3440	8210-1098	04713	2N3440	
Q2	Type 2N3440	8210-1098	04713	2N3440	
Q3	Type 2N3440	8210-1098	04713	2N3440	
Q4	Type 2N3440	8210-1098	04713	2N3440	
Q5	Type 2N4124	8210-1154	93916	2N4124	

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

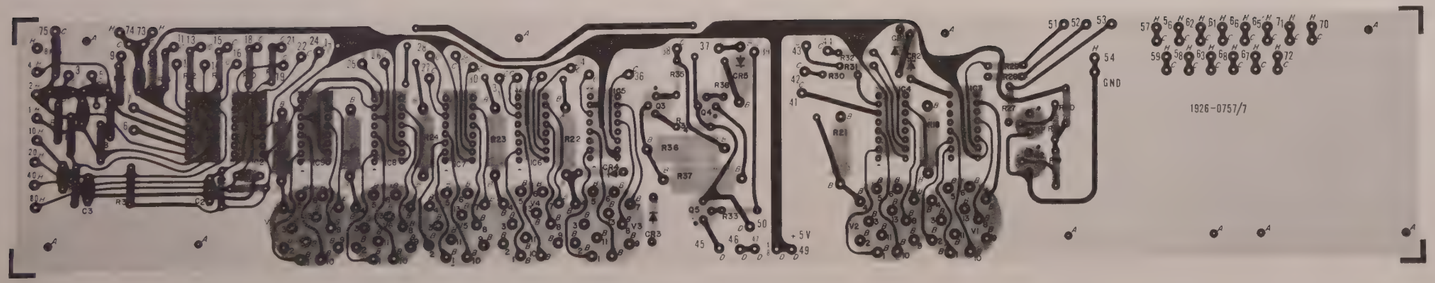


Figure 6-41. Etched-board assembly for display panel (board U). Complete board is P/N 1926-4757.

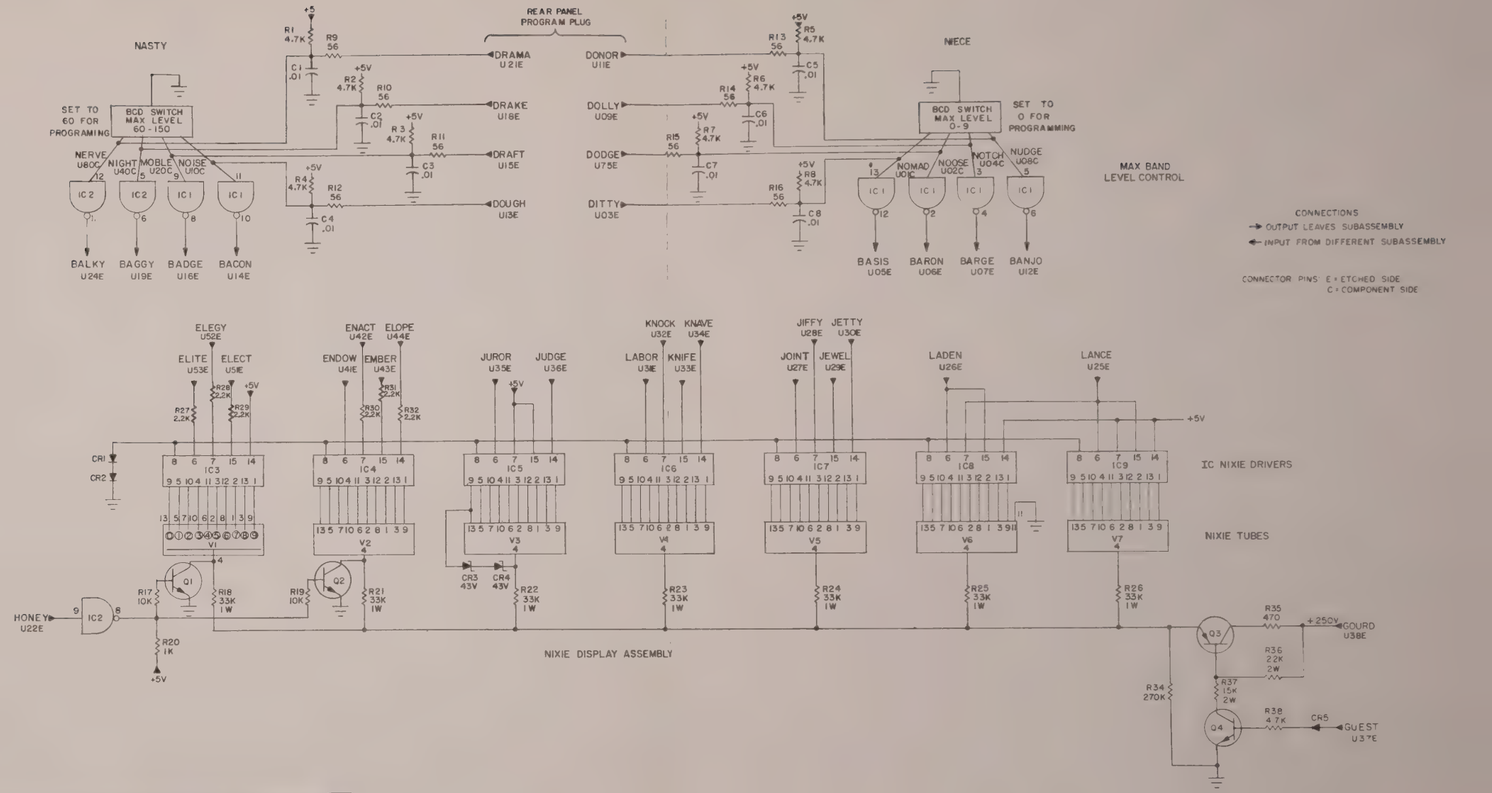


Figure 6-42. Schematic diagram of display panel.

NOTE UNLESS SPECIFIED

1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE.
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK.
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/4 WATT.
5. RESISTANCE IN OHMS K = 1000 OHMS M = 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS
7. KNOB CONTROL
8. SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C2	Electrolytic .200μF +150-10% 6 V	4450-2610	37942	TT, 200μF	5910-945-1836
C3	Electrolytic 4.7μF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C4	Electrolytic 10μF ±20% 20 V	4450-5100	56289	150D106X0020B2	5910-855-6343
C5	Ceramic 0.1μF +80-20% 100 V	4403-4100	80131	CC63, .1μF +80-20%	5910-811-4788
C6	Electrolytic 47 μF ±20% 20 V	4450-5702	37942	TT, 47 μF ±20%	
C7	Ceramic 0.1μF +80-20% 100 V	4403-4100	80131	CC63, .1μF +80-20%	5910-811-4788
C8	Ceramic 0.1μF +80-20% 100 V	4403-4100	80131	CC63, .1μF +80-20%	5910-811-4788
C9	Electrolytic, 47 μF ±20% 20 V	4450-5702	57942	TT, 47 μF ±20%	
C10	Electrolytic 100μF ±20% 20 V	4450-5704	56289	150D107X0020S3	
C11	Ceramic .05μF +80-20% 100 V	4403-3500	01121	40-503W	5910-883-7321
C12	Ceramic .05μF +80-20% 100 V	4403-3500	01121	40-503W	5910-883-7321
C13	Electrolytic 4.7μF ±20% 10 V	4450-4700	56289	150D465X0015B2	5910-813-8160
C14	Electrolytic 47μF ±20% 6 V	4450-5500	56289	150D476X0006B2	5910-752-4185
C15	Ceramic 0.1μF +80-20% 100 V	4403-4100	80131	CC63, .1μF +80-20%	5910-811-4788
DIODES					
CR1	Type 1N966B	6083-1078	91210	LMZ3.3A	
CR3	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR4	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR5	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR6	Type 1N957B	6083-1009	07910	1N957B	
CR7	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR8	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR9	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR10	Type 1N695	6082-1014	24446	1N695	
RESISTORS					
R1	Low Power Wire Wound 1 Ω ±5% 2 W	6760-9105	75042	BWH, 1 Ω ±5%	5905-279-3517
R2	Comp. 51 Ω ±5% 1/2 W	6100-0515	01121	RC20GF510J	5905-681-6462
R3	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R4	Comp. 10 Ω ±5% 1/4 W	6099-0105	75042	BTS, 10 Ω ±5%	5905-809-8596
R5	Comp. 1.2 kΩ ±5% 1/4 W	6099-2125	75042	BTS, 1.2 kΩ ±5%	
R6	Low Power Wire Wound 0.22 Ω ±10% 2 W	6761-9229	75042	BWH, 0.22 Ω ±10%	
R7	Comp. 22 Ω ±5% 1/4 W	6099-0225	75042	BTS, 22 Ω ±5%	5905-279-5459
R8	Comp. 2.7 kΩ ±5% 1/4 W	6099-2275	75042	BTS, 2.7 kΩ ±5%	
R9	Comp. 3.9 kΩ ±5% 1/4 W	6099-2395	75042	BTS, 3.9 kΩ ±5%	
R10	Film 1 kΩ ±1% 1/4 W	6350-1100	75042	CEB, 1 kΩ ±1%	5905-892-7018
R11	Film 3.99 kΩ ±1% 1/4 W	6350-1399	75042	CEB, 3.99 kΩ ±1%	
R13	Comp. 360 Ω ±5% 1/4 W	6099-1365	75042	BTS, 360 Ω ±5%	
R14	Comp. 10 Ω ±5% 1/4 W	6099-0105	75042	BTS, 10 Ω ±5%	5905-809-8596
R15	Film 5.11 kΩ ±1% 1/4 W	6350-1511	75042	CEB, 5.11 kΩ ±1%	
R16	Film 5.11 kΩ ±1% 1/4 W	6350-1511	75042	CEB, 5.11 kΩ ±1%	
R17	Comp. 39 kΩ ±5% 1/4 W	6099-3395	75042	BTS, 39 kΩ ±5%	5905-686-3358
R18	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R19	Comp. 47 Ω ±5% 1/4 W	6099-0475	75042	BTS, 47 Ω ±5%	
R20	Comp. 12 kΩ ±5% 1/4 W	6099-3125	75042	BTS, 12 kΩ ±5%	
R21	Comp. 10 Ω ±5% 1/4 W	6099-0105	75042	BTS, 10 Ω ±5%	5905-809-8596
R22	Low Power Wire Wound 1.5 Ω ±5% 2 W	6760-9159	75042	BWH, 1.5 Ω ±5%	
R23	Comp. 360 Ω ±5% 1/4 W	6099-1365	75042	BTS, 360 Ω ±5%	
R24	Comp. 3.3 kΩ ±5% 1/4 W	6099-2335	75042	BTS, 3.3 kΩ ±5%	5905-681-9969
R25	Comp. 47 Ω ±5% 1/4 W	6099-0475	75042	BTS, 47 Ω ±5%	
R26	Comp. 6.2 kΩ ±5% 1/4 W	6099-2625	75042	BTS, 6.2 kΩ ±5%	5905-682-4100
R27	Comp. 750 Ω ±5% 1/4 W	6099-1755	75042	BTS, 750 Ω ±5%	
R28	Comp. 7.5 kΩ ±5% 1/4 W	6099-2755	75042	BTS, 7.5 kΩ ±5%	
R29	Film 3.16 kΩ ±1% 1/4 W	6350-1316	75042	CEB, 3.16 kΩ ±1%	
R30	Pot. Comp. 1 kΩ ±20%	6040-0400	01121	FWC, 1 kΩ ±20%	
R31	Film 5.36 kΩ ±1% 1/4 W	6350-1536	75042	CEB, 5.36 kΩ ±1%	5905-892-6853
R32	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R33	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R34	Low Power Wire Wound 10 Ω ±5% 2 W	6760-0105	75042	BWH, 10 Ω ±5%	
R35	Comp. 620 Ω ±5% 1/4 W	6099-1625	75042	BTS, 620 Ω ±5%	5905-801-6998
R36	Comp. 2 kΩ ±5% 1/4 W	6099-2205	75042	BTS, 2 kΩ ±5%	5905-279-4629
R37	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462
R38	Comp. 2.7 kΩ ±5% 1/4 W	6099-2275	75042	BTS, 2.7 kΩ ±5%	
R39	Comp. 1.2 kΩ ±5% 1/4 W	6099-2125	75042	BTS, 1.2 kΩ ±5%	
R40	Comp. 1 kΩ ±5% 1/4 W	6099-2105	75042	BTS, 1 kΩ ±5%	5905-681-6462

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R41	Film 2.0 kΩ ±1% 1/4 W	6350-1200	75042	CEB, 2 kΩ ±1%	5905-538-3516
R42	Film 2.0 kΩ ±1% 1/4 W	6350-1200	75042	CEB, 2 kΩ ±1%	5905-538-3516
R43	Film 3.99 kΩ ±1% 1/4 W	6350-1399	75042	CEB, 3.99 kΩ ±1%	
R44	Comp. 4.7 Ω ±5% 1/4 W	6099-9475	75042	BTS, 4.7 Ω ±5%	
R45	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R46	Film 1 kΩ ±1% 1/8 W	6250-1100	75042	CEA, 1 kΩ ±1%	5905-581-6915
R47	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R48	Comp. 10 Ω ±5% 1/2 W	6100-0105	01121	RC20GF100J	5905-190-8883
R49	Comp. 680 Ω ±5% 1 W	6110-1685	01121	GF, 680 Ω ±5%	
R50	Low Power Wire Wound 0.22 Ω ±10% 2 W	6761-9229	75042	BWH, .22 Ω ±10%	
R51	Comp. 200 Ω ±5% 1/2 W	6100-1205	01121	RC20GF201J	5905-279-2674
R52	Low Power Wire Wound 75 Ω ±5% 2 W	6760-0755	75042	BWH, 75 Ω ±5%	
R53	Low Power Wire Wound 0.62 Ω ±5% 2 W	6760-8625	75042	BWH, .62 Ω ±5%	
R54	Comp., 100 Ω ±5%	6099-1105	75042	BTS, 100 Ω ±5%	
TRANSISTORS					
Q1	Type 2N1131	8210-1025	96214	2N1131	5960-788-8644
Q2	Type 2N697	8210-1040	82219	2N697	5961-752-0150
Q3	Type 2N3414	8210-1047	24446	2N3414	5961-989-2749
Q4	Type 2N3905	8210-1114	04713	2N3905	
Q5	Type 2N3905	8210-1114	04713	2N3905	
Q6	Type 2N3905	8210-1114	04713	2N3905	
Q8	Type 2N3903	8210-1132	93916	2N3903	
Q9	Type 2N3905	8210-1114	04713	2N3905	
Q10	Type 2N3903	8210-1132	93916	2N3903	
Q11	Type 2N697	8210-1040	82219	2N697	5961-752-0150
Q12	Type 2N3905	8210-1114	04713	2N3905	
Q13	Type 2N3414	8210-1047	24446	2N3414	5961-989-2749
Q14	Type 2N3905	8210-1114	04713	2N3905	
Q15	Type 2N3414	8210-1047	24446	2N3414	5961-989-2749
Q16	Type 2N3414	8210-1047	24446	2N3414	5961-989-2749
Q17	Type 2N3905	8210-1114	04713	2N3905	
Q18	Type 2N3905	8210-1114	04713	2N3905	
Q19	Type 2N3414	8210-1047	24446	2N3414	5961-989-2749
Q20	Type 2N3905	8210-1114	04713	2N3905	
Q21	Type 2N3905	8210-1114	04713	2N3905	
Q22	Type 2N3905	8210-1114	04713	2N3905	

Figure 6-43. Etched-board assembly for the power supply (board V). Complete board is P/N 1926-4748.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.

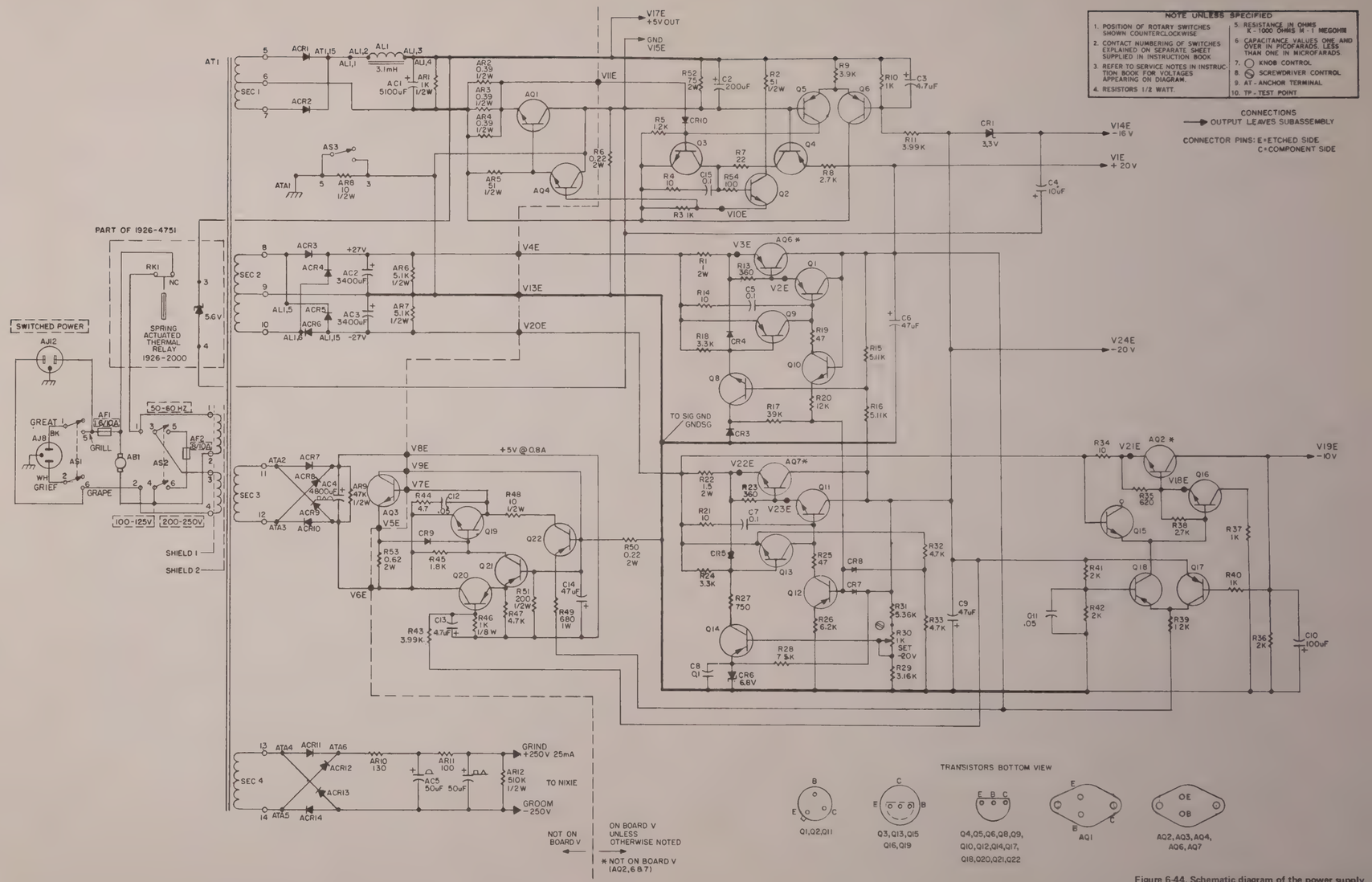

NOTE UNLESS SPECIFIED
1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/2 WATT.
5. RESISTANCE IN OHMS K=1000 OHMS M=1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS
7. KNOB CONTROL
8. SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT
CONNECTIONS
OUTPUT LEAVES SUBASSEMBLY
CONNECTOR PINS: E=ETCHED SIDE C=COMPONENT SIDE
VI7E +5V OUT
GND VI5E
VIIE
VI4E -16 V
VIE +20V
V24E -20 V
V19E -10V
PART OF 1926-4751
SWITCHED POWER
SPRING ACTUATED THERMAL RELAY 1926-2000
SHIELD 1
SHIELD 2
TO SIG GND GNDSG
+5V @0.8A
GRIND +250V 25mA
TO NIXIE
GROOM -250V
NOT ON BOARD V
ON BOARD V UNLESS OTHERWISE NOTED
* NOT ON BOARD V (AQ2,6&7)
TRANSISTORS BOTTOM VIEW
Q1,Q2,Q11
Q3,Q13,Q15 Q16,Q19
Q4,Q5,Q6,Q8,Q9, Q10,Q12,Q14,Q17, Q18,Q20,Q21,Q22
AQ1
AQ2,AQ3,AQ4, AQ6,AQ7

Figure 6-44. Schematic diagram of the power supply.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C101	Plastic .01μF ±10% 100 V	4860-7750	84411	663UW, .01μF ±10%	
C102	Plastic .01μF ±10% 100 V	4860-7750	84411	663UW, .01μF ±10%	
C103	Electrolytic 15 μF +150-10% 15 V	4450-3700	37942	TT, 15 μF 15 V	
C104	Electrolytic 10 μF +150-10% 25 V	4450-3800	56289	30D106G025BB4M1	5910-952-8658
C106	Ceramic .022 μF +80-20%	4407-3229	72982	30D106G025BB4M1	5910-952-8658
C107	Plastic .022 μF ±10% 100 V	4860-7860	84411	663UW, .022 μF ±10%	5910-055-6119
INTEGRATED CIRCUITS					
IC1	Type 9016	5431-9608	07263	TTμL-9016	
IC2	Type 9016	5431-9608	07263	TTμL-9016	
IC3	Type 9016	5431-9608	07263	TTμL-9016	
IC4	Type 936	5431-9362	07263	DTμL-936	
IC5	Type 936	5431-9362	07263	DTμL-936	
IC6	Type 9016	5431-9608	07263	TTμL-9016	
IC7	Type 9016	5431-9608	07263	TTμL-9016	
DIODES					
CR101	Type 1N825	6083-1060	75042	1N825	
CR102	Type 1N816	6083-1001	14433	1N816	
RESISTORS					
R101	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R102	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R103	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R104	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R105	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R106	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R107	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R108	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R109	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R110	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R111	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R112	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R113	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R114	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R115	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R116	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R117	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R118	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R119	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R120	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R121	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R122	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R123	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R124	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R125	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R126	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R127	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R128	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R129	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R130	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R131	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R132	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R133	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R134	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R135	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R136	Comp. 3.0 kΩ ±5% 1/4 W	6099-2305	75042	BTS, 3 kΩ ±5%	5905-682-4097
R137	Comp. 1.8 kΩ ±5% 1/4 W	6099-2185	75042	BTS, 1.8 kΩ ±5%	5905-688-3738
R138	Comp. 15 kΩ ±5% 1/4 W	6099-3155	75042	BTS, 15 kΩ ±5%	5905-681-8818
R139	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107
R140	Comp. 200 Ω ±5% 1/4 W	6099-1205	75042	BTS, 200 Ω ±5%	5905-892-0107

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS (Cont)					
R141	Film 10 kΩ ±1% 1/8 W	6250-2100	75042	CEA, 10.5 kΩ ±1%	5905-882-0037
R142	Film 10 kΩ ±1% 1/8 W	6250-2100	75042	CEA, 10.5 kΩ ±1%	5905-882-0037
R143	Comp. 30 kΩ ±5% 1/4 W	6099-3305	75042	BTS, 30 kΩ ±5%	5905-803-2908
R144	Comp. 470 Ω ±5% 1/2 W	6100-1475	01121	RC20GF471J	5905-192-3973
R145	Comp. 100 Ω ±5% 1/4 W	6100-1105	01121	RC20GF101J	5905-190-8889
R149	Comp. 4.7 kΩ ±5% 1/4 W	6099-2475	75042	BTS, 4.7 kΩ ±5%	5905-686-9998
R150	Comp. 10 kΩ ±5% 1/4 W	6099-3105	75042	BTS, 10 kΩ ±5%	5905-683-2238
R151	Comp. 2 kΩ ±5% 1/2 W	6100-2205	01121	RC20GF202J	5905-190-8887
R152	Comp. 1.3 kΩ ±5% 1/4 W	6099-2135	75042	BTS, 1.3 kΩ ±5%	5905-686-3119
R153	Film 100 kΩ ±1% 1/8 W	6250-3100	75042	CEA, 100 kΩ ±1%	5905-577-6743
R154	Comp. 680 Ω ±5% 1/4 W	6099-1685	75042	BTS, 680 Ω ±5%	
R155	Film 100 kΩ ±1% 1/8 W	6250-3100	75042	CEA, 100 kΩ ±1%	5905-577-6743
R156	Comp. 100 Ω ±5% 1/2 W	6100-1105	01121	RC20GF101J	5905-190-8889
R157	Film 511 Ω ±1% 1/8 W	6250-0511	75042	CEA, 511 Ω ±1%	5905-721-0287
R158	Pot. wire wound 500 Ω ±10%	6051-1507	02660	2600PC, 500 Ω ±10%	
R159	Film 1.5 kΩ ±1% 1/8 W	6250-1150	75042	CEA, 1.5 kΩ ±1%	5905-581-6913
R160	Comp. 30 Ω ±5% 1/4 W	6099-0305	75042	BTS, 30 Ω ±5%	
R161	Comp. 510 Ω ±5% 1/4 W	6099-1515	75042	BTS, 510 Ω ±5%	5905-801-8272
R162	Comp. 2.4 kΩ ±5% 1/4 W	6099-2245	75042	BTS, 2.4 kΩ ±5%	5905-683-7724
R163	Film 20 kΩ ±1% 1/8 W	6250-2200	75042	CEA, 20 kΩ ±1%	5905-702-5971
R164	Thermistor 5 kΩ ±1/2% 1/8 W	6619-1355	75042	CEA-TO, 5 kΩ ±.5%	
R165	Film 10 kΩ ±1% 1/8 W	6250-2100	75042	CEA, 10 kΩ ±1%	5905-883-4847
R166	Film 20 kΩ ±1% 1/8 W	6250-2200	75042	CEA, 20 kΩ ±1%	5905-702-5971
R167	Film 40 kΩ ±1% 1/8 W	6619-1940	75042	CEA-TO, 40 kΩ ±1%	
R168	Film 80 kΩ ±1% 1/8 W	6619-1960	75042	CEA-TO, 80 kΩ ±1%	
R169	Film 160 kΩ ±1% 1/8 W	6619-1990	75042	CEA-TO, 160 kΩ ±1%	
R170	Film 320 kΩ ±1% 1/8 W	6619-2020	75042	CEA-TO, 320 kΩ ±1%	
R171	Film 640 kΩ ±1% 1/8 W	6619-2050	75042	CEA-TO, 640 kΩ ±1%	
R172	Film 640 kΩ ±1% 1/8 W	6619-2050	75042	CEA-TO, 640 kΩ ±1%	
R175	Film 3.48 kΩ ±1% 1/8 W	6250-1348	75042	CEA, 3.48 kΩ ±1%	5905-686-3385
R176	Film 1.0 kΩ ±1% 1/8 W	6250-1100	75042	CEA, 1 kΩ ±1%	5905-581-6915
TRANSISTORS					
Q101	Type 2N4123	8210-1123	93916	2N4123	
Q102	Type TN-80	8210-1185	56289	TN-80	
Q103	Type 2N4123	8210-1123	93916	2N4123	
Q104	Type TN-80	8210-1185	56289	TN-80	
Q105	Type 2N4123	8210-1123	93916	2N4123	
Q106	Type TN-80	8210-1185	56289	TN-80	
Q107	Type 2N4123	8210-1123	93916	2N4123	
Q108	Type TN-80	8210-1185	56289	TN-80	
Q109	Type 2N4123	8210-1123	93916	2N4123	
Q110	Type TN-80	8210-1185	56289	TN-80	
Q111	Type 2N4123	8210-1123	93916	2N4123	
Q112	Type TN-80	8210-1185	56289	TN-80	
Q113	Type 2N4123	8210-1123	93916	2N4123	
Q114	Type TN-80	8210-1185	56289	TN-80	
Q115	Type 2N4123	8210-1123	93916	2N4123	
Q116	Type TN-80	8210-1185	56289	TN-80	
Q117	Type 2N4123	8210-1123	93916	2N4123	
Q118	Type TN-80	8210-1185	56289	TN-80	
Q119	Type 2N4123	8210-1123	93916	2N4123	
Q120	Type TN-80	8210-1185	56289	TN-80	
Q121	Type 2N4123	8210-1123	93916	2N4123	
Q122	Type TN-80	8210-1185	56289	TN-80	
Q123	Type 2N4123	8210-1123	93916	2N4123	
Q124	Type TN-80	8210-1185	56289	TN-80	
Q125	Type 2N4123	8210-1123	93916	2N4123	
Q126	Type TN-80	8210-1185	56289	TN-80	
Q127	Type 2N4123	8210-1123	93916	2N4123	
Q128	Type TN-80	8210-1185	56289	TN-80	
Q129	Type 2N4123	8210-1123	93916	2N4123	
Q130	Type TN-80	8210-1185	56289	TN-80	
Q131	Type 2N4123	8210-1123	93916	2N4123	
Q132	Type TN-80	8210-1185	56289	TN-80	
Q133	Type TD-100	8210-1130	56289	TD100	
Q134	Type TD-400	8210-1169	56289	TD400	
Q135	Type 2N3903	8210-1132	93916	2N3903	
Q136	Type TD-100	8210-1130	56289	TD100	
Q137	Type TD-100	8210-1130	56289	TD100	
Q138	Type 2N1132	8210-1153	04713	2N1132	

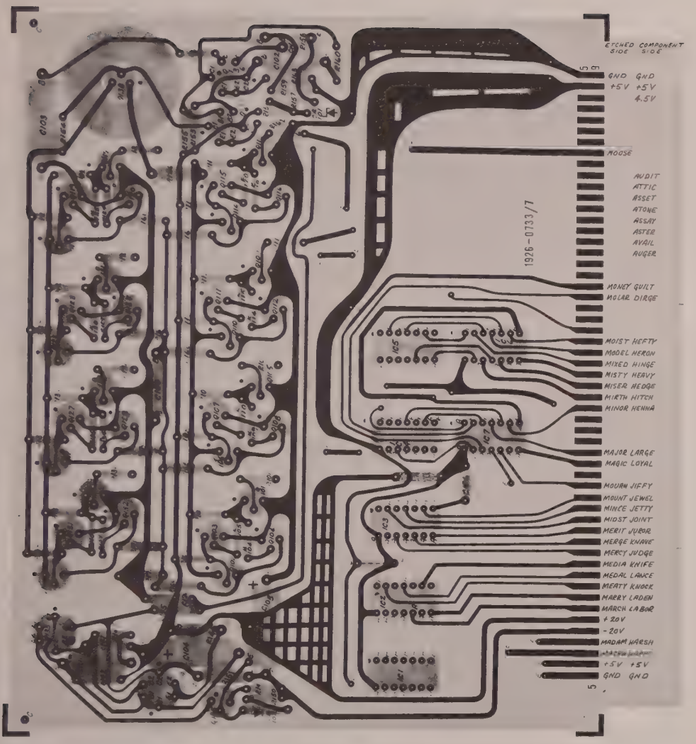
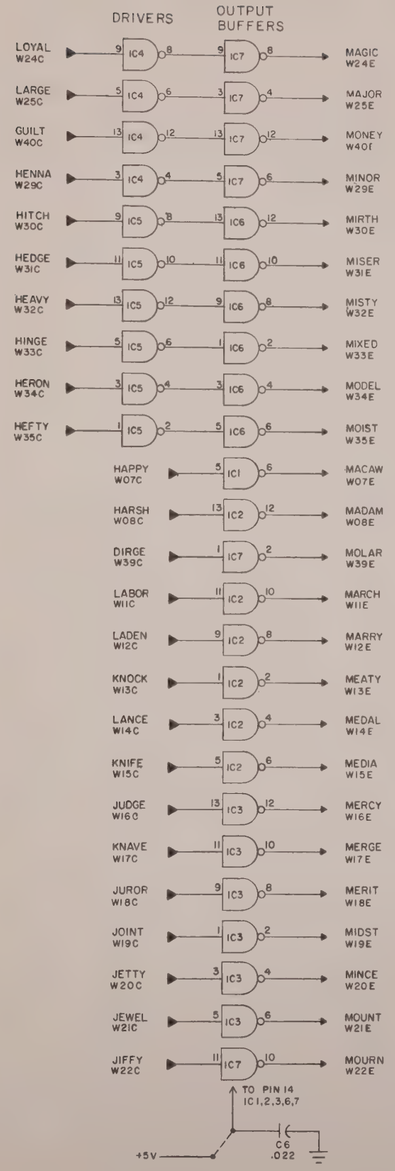


Figure 6-45. Etched-board assembly for output buffers and D-A converter (board W). Complete board is P/N 1926-4733.

NOTE: The board is shown foil-side up. The number appearing on the foil side is *not* the part number. The dot on the foil at the transistor socket indicates the collector lead.



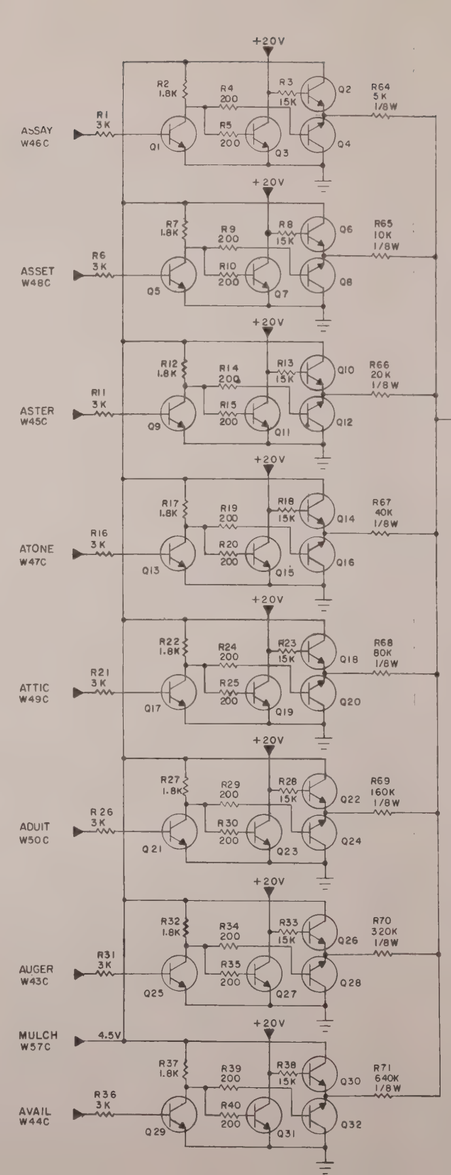


Figure 6-46. Schematic diagram of the output buffers and D-A converter.

ELECTRICAL PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
BLOWER					
AB1	Fan	5180-4691	93916	WS2107F-2	
CAPACITORS					
AC1	Electrolytic, 5100 µF +75 -10% 20 V	4450-6223	56289	32D, 5100 µF +75 -10%	
AC2	Electrolytic, 3400 µF +75 -10% 20 V	4450-6223	56289	32D342G030BAGB	
AC3	Electrolytic, 3400 µF +75 -10% 20 V	4450-6221	56289	32D342G030BAGB	
AC4	Electrolytic, 2400, 1200, 1200 µF 15 V	4450-4200	37942	20-21339-99-6	
AC5	Electrolytic, 50, 25, 25 µF 50 V	4450-0800	56289	D28936	5910-970-1589
CONNECTORS					
AJ1	Multiple Socket, (TO1522)	4230-4024	93916	57-40240	
AJ2	Multiple Socket, Panel Controls	4230-4049	93916	57-40500	5935-062-1776
AJ3	Multiple Socket, (TO1566)	4230-4024	93916	57-40240	
AJ4	Multiple Socket, Digital Output	4230-4049	93916	57-40500	5935-062-1776
AJ5	Multiple Socket, Channel Inputs (to Aux. 1925)	4230-4036	93916	57-40360	
AJ6	Multiple Socket, Channel Inputs (to Aux. 1925)	4230-4036	93916	57-40360	
AJ7	Multiple Socket	4230-4036	93916	57-40360	
AJ8	Multiple Plug, Power	4240-0600	24655	4240-0600	5935-816-0254
AJ9	Multiple Socket	4230-2724	95354	91-6024-1201-00	5935-688-9925
AJ10	Multiple Socket	4230-2301	09408	UG-1094A/U	
AJ11	Multiple Socket	4230-2301	09408	UG-1094A/U	
AJ12	Power Receptacle, Switched Power	4250-0600	24655	4250-0600	
AJ13	Multiple Socket	4230-5406	02660	126-198	
AP1	Multiple Socket	4230-3050	24655	4230-3050	
AP2	Multiple Socket	4230-3050		4230-3050	
AP3	Multiple Socket	4220-5402	02660	126-195	
DIODES					
ACR1	Type MV16A	6081-1005	94154	1N3492	
ACR2	Type MV16A	6081-1005	94154	1N3492	
ACR3	Type 1N3253	6081-1001	79089	1N3253	5961-814-4251
ACR4	Type 1N3253	6081-1001	79089	1N3253	5961-814-4251
ACR5	Type 1N3253	6081-1001	79089	1N3253	5961-814-4251
ACR6	Type 1N3253	6081-1001	79089	1N3253	5961-814-4251
ACR7	Type 1N4140	6081-1014	13327	1N4140	
ACR8	Type 1N4140	6081-1014	13327	1N4140	
ACR9	Type 1N4140	6081-1014	13327	1N4140	
ACR10	Type 1N4140	6081-1014	13327	1N4140	
ACR11	Type 1N3254	6081-1002	09213	1N3254	5961-082-3988
ACR12	Type 1N3254	6081-1002	09213	1N3254	5961-082-3988
ACR13	Type 1N3254	6081-1002	09213	1N3254	5961-082-3988
ACR14	Type 1N3254	6081-1002	09213	1N3254	5961-082-3988
ACR15	Type 1N995	6082-1002	80368	1N995	
ACR16	Type 1N995	6082-1002	80368	1N995	
FUSES					
AF1	Slo-blo	5330-1700	71400	MDL, 1.6 Amp	5920-131-9819
AF1	Slo-blo	5330-1200	71400	MDL, .8 Amp	5920-284-6733
INDICATORS					
AV1	Digital	5437-0845	83781	NL-845	
AV2	Digital	5437-0845	83781	NL-845	
AV3	Digital	5437-0845	83781	NL-845	
AV4	Digital	5437-0845	83781	NL-845	
AV5	Digital	5437-0845	83781	NL-845	
AV6	Digital	5437-0845	83781	NL-845	
AV7	Digital	5437-0845	83781	NL-845	
LAMPS					
ADS1	Pilot Light	5600-0316	71744	#345	
ADS2	Pilot Light	5600-0318	71744	#338	
ADS3	Pilot Light	5600-0318	71744	#338	
Relay					
AK1	24 V	6090-1000	78277	42F∈DPDT) 2500 Ω	

ELECTRICAL PARTS LIST (cont)

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
RESISTORS					
AR1	Composition, 1 kΩ ±5%	6100-2105	01121	RC20GF102J	5905-195-6806
AR2	Composition, .39 Ω ±5%	6100-8395	01121	EB, .39 Ω ±5%	
AR3	Composition, .39 Ω ±5%	6100-8395	01121	EB, .39 Ω ±5%	
AR4	Composition, .39 Ω ±5%	6760-8395	75042	BWH, .39 Ω ±5%	
AR5	Composition, 51 Ω ±5%	6100-0515	01121	RC20GF510J	5905-279-3517
AR6	Composition, 5.1 kΩ ±5%	6100-2515	01121	RC20GF512J	5905-279-2019
AR7	Composition, 5.1 kΩ ±5%	6100-2515	01121	RC20GF512J	5905-279-2019
AR8	Composition, 10 Ω ±5%	6100-0105	01121	RC20GF100J	5905-190-8883
AR9	Composition, 47 kΩ ±5%	6100-3475	01121	RC20GF473J	5905-254-9201
AR10	Composition, 130 Ω ±5%	6120-1135	01121	HB, 130 Ω ±5%	
AR11	Composition, 100 Ω ±5%	6110-1105	01121	RC32GF101J	5905-279-2643
AR12	Composition, 510 kΩ ±5%	6100-4515	01121	RC20GF514J	5905-279-2516
SWITCHES					
AS1	Toggle, Power On/Off	7910-1300	04009	83053-SA	5930-909-3510
AS2	Toggle, Line Voltage Selector	7910-0831	42190	4603	
AS3	Toggle, Chassis Connected to Circuit Ground Direct Through 10 Ω.	7910-0770	76854	#77	5930-574-2587
AS4	Rotary wafer	7890-5305	24655	7890-5305	
AS5	Thumbwheel, Lowest Band Number	7917-1008	07126	3G-480	
AS6	Thumbwheel, Highest Band Number	7917-1006	07126	3G-405	
AS7	Thumbwheel, Maximum Band Level dB	7917-1007	07126	3G-406	
AS8	Pushbutton, Multiple, Integration Time-Seconds	7880-2080	71590	PB10	
AS9	Pushbutton, Multiple, Measurement Mode	7880-2085	71590	PB15	
AS10	Pushbutton, Multiple, Output Display	7880-2095	71590	PB15	
AS11	Pushbutton, Multiple, Start; Pause; Stop	7880-2090	71590	PB15	
TRANSFORMERS					
AL1	Power	0345-4003	24655	0345-4003	
AT1	Power	0365-4070	24655	0365-4070	
TRANSISTORS					
AQ1	Type 2N3055	8210-1097	12672	40251	
AQ2	Type 40250	8210-1095	12672	40250	
AQ3	Type 40250	8210-1095	12672	40250	
AQ4	Type 40250	8210-1095	12672	40250	
AQ6	Type 2N3740	8210-1121	93916	2N3741	
AQ7	Type 40250	8210-1095	12672	40250	

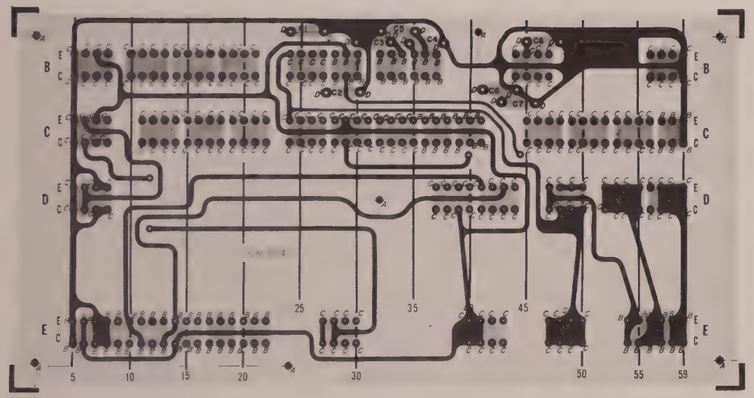
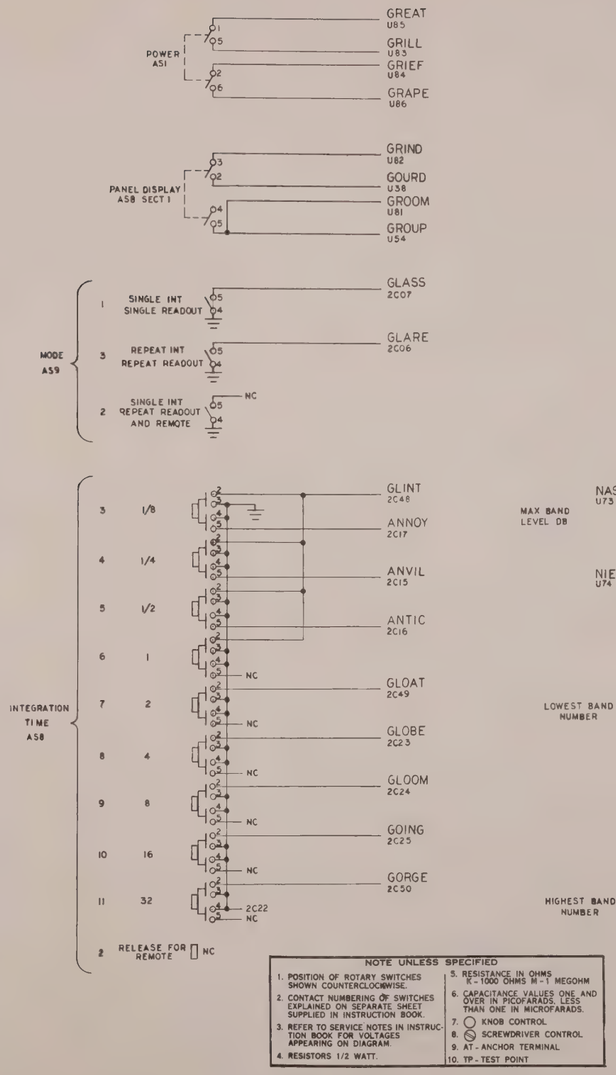
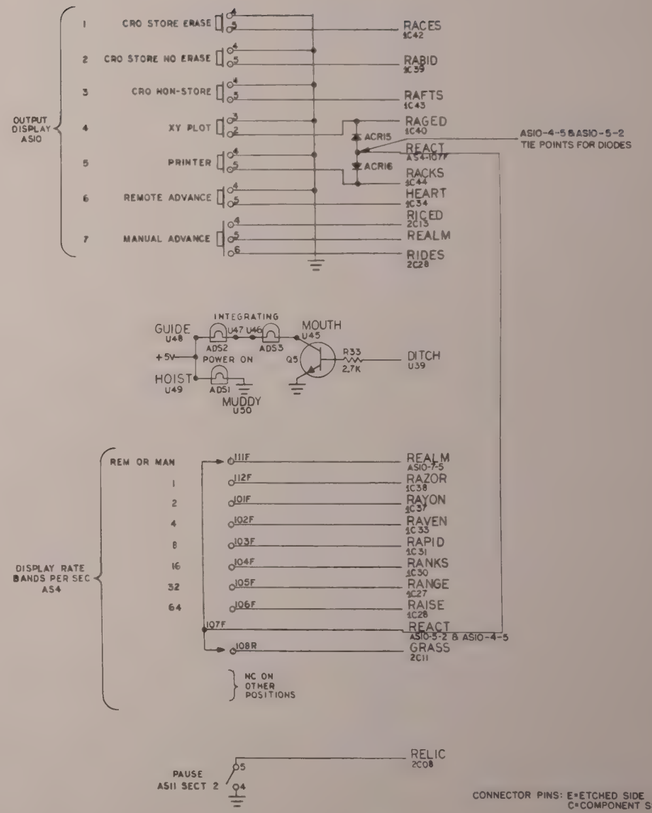


Figure 6-47. Etched-board assembly for the small mother board (X). Complete board is P/N 1926-4754.



NOTE UNLESS SPECIFIED

1. POSITION OF ROTARY SWITCHES SHOWN COUNTERCLOCKWISE.
2. CONTACT NUMBERING OF SWITCHES EXPLAINED ON SEPARATE SHEET SUPPLIED IN INSTRUCTION BOOK.
3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/2 WATT.
5. RESISTANCE IN OHMS K - 1000 OHMS M - 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS. LESS THAN ONE IN MICROFARADS.
7. ◯ KNOB CONTROL
8. ⊘ SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT



CONNECTOR PINS: E=ETCHED SIDE C=COMPONENT SIDE

Figure 6-48. Schematic diagram of front-panel interface.

START — AJ2, 1 / AJ3, 17 — MOMENTARY GND POTENTIAL → FRIAR; AJ2, 4 → SIGNAL GND

MODE

1. SINGLE INTEGRATE & READOUT — AJ2, 3 → GROUND HERE → GLASS

2. SINGLE INTEGRATE REPEAT DISPLAY
NO GROUND

3. INTEGRATE, DISPLAY, REPEAT — AJ2,28 → GROUND HERE → GLARE

NOTE:
FRONT PANEL PUSHBUTTON MUST BE SET TO SINGLE INTEGRATE, REPEAT DISPLAY FOR PROGRAMMING TO WORK.

STOP — GND FOR 250 NS OR MORE — AJ3, 18 / AJ2, 2 → GRAVY

PAUSE — PAUSE WHILE THIS TERMINAL IS GND'D. — AJ2, 44 → RELIC

INTEGRATION TIME
SET F.P. BUTTONS TO RELEASE

TIME	GROUND
1/8 SEC	GLINT ANNOY
1/4	GLINT ANVIL
1/2	GLINT ANTIC
1	GLINT
2	GLOAT
4	GLOBE
8	GLOOM
16	GOING
32	GORGE

AJ2, 5 → GLINT
AJ2, 6 → GLOAT
AJ2, 7 → GLOBE
AJ2, 8 → GLOOM
AJ2, 9 → GOING
AJ2, 10 → GORGE
AJ2, 30 → ANNOY
AJ2, 31 → ANVIL
AJ2, 32 → ANTIC

1566 NUMBER OF MICROPHONES

N.B. INT. TIME MUST BE 1 SEC.

#	GROUND
1	NOTHING
2	FRILL
4	FRIED
8	FRAUD
16	FRANK

(THESE ARE NOT AT THE FRONT PANEL)

AJ3, 13 → FRILL
AJ3, 14 → FRIED
AJ3, 1 → FRAUD
AJ3, 2 → FRANK
AJ3, 3 → SIGNAL GND

NOTE UNLESS SPECIFIED

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3. REFER TO SERVICE NOTES IN INSTRUCTION BOOK FOR VOLTAGES APPEARING ON DIAGRAM.
4. RESISTORS 1/2 WATT.
5. RESISTANCE IN OHMS K - 1000 OHMS M - 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS.
7. ◯ KNOB CONTROL
8. ⊘ SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT

SIGNAL NOTES
→ OUTPUT LEAVES SUBASSEMBLY
→ INPUT FROM DIFFERENT SUBASSEMBLY

1566 CONTROL SIGNAL

MANUAL START — AJ3, 17 / AJ2, 1 → FRIAR
STOP — AJ3, 18 / AJ2, 2 → GRAVY
ADVANCE PULSE TO 1566 — AJ3, 4 → MONEY
RESUME PULSE FROM 1566 — AJ3, 16 → HABIT
DISPLAY - INTEGRATE MODES — AJ3, 5 / AJ2, 49 → INT, DISP → DITCH
AJ3, 6 / AJ4, 17 → DISPLAY, INT → DIRGE

OUTPUT DWELL TIME — THIS ONE FUNCTION IS NOT EXTERNALLY PROGRAMMABLE BUT SEE NEXT ENTRY BELOW.

SCAN ADVANCE, REMOTE — AJ2,27 → FRESH
SHORT TO GND AT LEAST 1/4μ SEC TO ADVANCE CHANNEL (NORMALLY +5 VOLTS)

SCAN ADVANCE, CONTROLLED BY PUNCH, PRINTER, ETC.

START PUNCH OR PRINTER — START → AJ4, 24 → MADAM; START, SEE NOTE 1 → AJ1, 10 / AJ4, 43 → MACAW

PUNCH OR PRINT COMPLETE, ADVANCE CHANNEL — AJ1, 9 / AJ4, 19 → SEE NOTES 2,3 → HASTE; AJ1, 2 / AJ4, 45 → SEE NOTES 2,3 → HEATH

NOTES:
1. VOLTAGES REMAIN AT LEVELS SHOWN UNTIL PUNCH OR PRINTER SENDS BACK A COMPLETED SIGNAL
2. AT LEAST 1/4 MICROSECOND
3. TO USE HASTE, GROUND HEATH. TO USE HEATH, NO CONNECTION OR +5V ON HASTE.

RECORDER PEN, TRACE BRIGHTNER, ETC.

GROUND POTENTIAL DURING DISPLAY — AJ4, 24 → MADAM
APPROXIMATELY +5V DURING DISPLAY — AJ1, 10 / AJ4, 43 → MACAW
AJ1, 13 / AJ4, 48 → SIGNAL GND

EXTERNAL OPERATE COMMAND
(ANOTHER METHOD OF GENERATING THE START COMMAND)

GROUND POTENTIAL FOR AT LEAST 1/4 MICROSECOND. AJ2, 26 → HANDY
(NORMALLY +5 VOLTS)

MAXIMUM LEVEL DB SWITCHING

DB				
60	NONE			
70	DOUGH			
80		DRAFT		
90	DOUGH	DRAFT		
100			DRAKE	
110	DOUGH		DRAKE	
120		DRAFT	DRAKE	
130	DOUGH	DRAFT	DRAKE	
140				DRAMA
150	DOUGH			DRAMA

AJ3, 23 → DOUGH
AJ3, 24 → DRAFT
AJ3, 11 → DRAKE
AJ3, 12 → DRAMA

0	NONE			
1	DITTY			
2		DODGE		
3	DITTY	DODGE		
4			DOLLY	
5	DITTY		DOLLY	
6		DODGE	DOLLY	
7	DITTY	DODGE	DOLLY	
8				DONOR
9	DITTY			DONOR

AJ3, 21 → DITTY
AJ3, 22 → DODGE
AJ3, 9 → DOLLY
AJ3, 10 → DONOR
AJ3, 3 → SIGNAL GND

IMPORTANT: SET FRONT PANEL READING TO 60

BAND NUMBER BCD

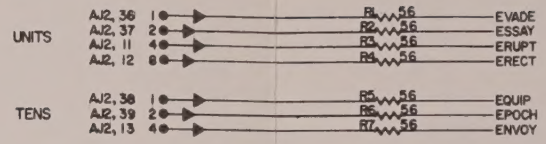
		BCD WEIGHTS
TENS:	AJ4, 15 → MOIST	10
	AJ4, 16 → MISER	20
	AJ4, 40 → MISTY	40
	AJ4, 41 →	
UNITS:	AJ4, 13 → MIRTH	1
	AJ4, 14 → MIXED	2
	AJ4, 38 → MODEL	4
	AJ4, 39 → MINOR	8

LOGICAL 1 = +5V
LOGICAL 0 = 0V

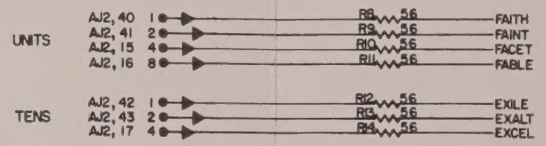
Figure 6-49. Schematic diagram of rear-panel interface. See, also, Figure 6-50.

OUTPUT SCAN CONTROL
NOTE: SET F.P. SCAN CONTROL SWITCHES TO 00,00.

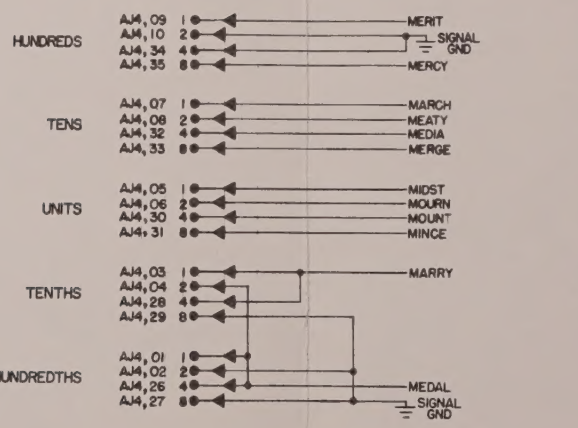
LOWEST BAND NUMBER, BCD
TO SELECT A WIRE, CONNECT IT TO GROUND (0V = LOGICAL 1)



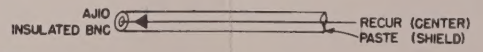
HIGHEST BAND NUMBER, BCD
TO SELECT A WIRE, CONNECT IT TO GROUND (0V = LOGICAL 1)



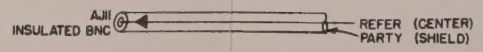
DIGITAL BAND LEVEL, BCD
+5V = LOGICAL 1
0V = LOGICAL 0



ANALOG BAND NUMBER



ANALOG BAND LEVEL



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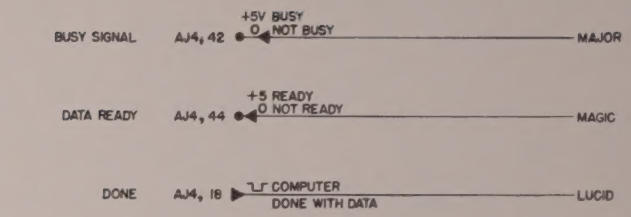
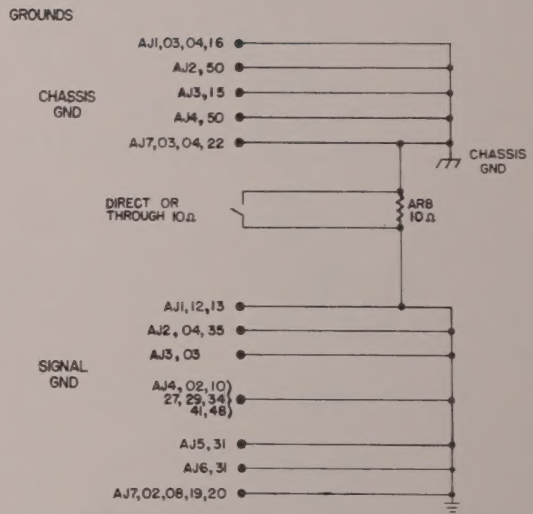
5. RESISTANCE IN OHMS K - 1000 OHMS M - 1 MEGOHM
6. CAPACITANCE VALUES ONE AND OVER IN PICOFARADS, LESS THAN ONE IN MICROFARADS.
7. ◯ KNOB CONTROL
8. ⊘ SCREWDRIVER CONTROL
9. AT - ANCHOR TERMINAL
10. TP - TEST POINT

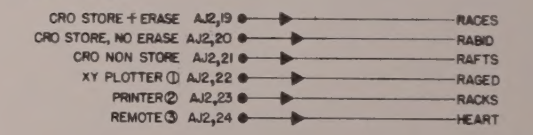
COMPUTER COMMANDS



GROUNDS



OUTPUT DISPLAY



①ALSO ENABLES PRINTER, NIXIES, & CRO STORE NON-ERASE.
②ALSO ENABLES CRO STORE NON-ERASE.
③OUTPUT DEVICE MUST "TALK BACK" VIA HASTE, HEATH, AND/OR LUCID.
ALL OUTPUT FUNCTIONS ARE IN ENABLED STATE.

Figure 6-50. Schematic diagram of rear-panel interface. See, also, Figure 6-49.

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